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MARITIME REPORTER AND ENGINEERING NEWS

MARINELINK.COM

February 2016

Cruise Annual

Safe Cruising Down Under
Australian Reef Pilots

Big Data & Cruising Toward
A Cloud of Bandwidth

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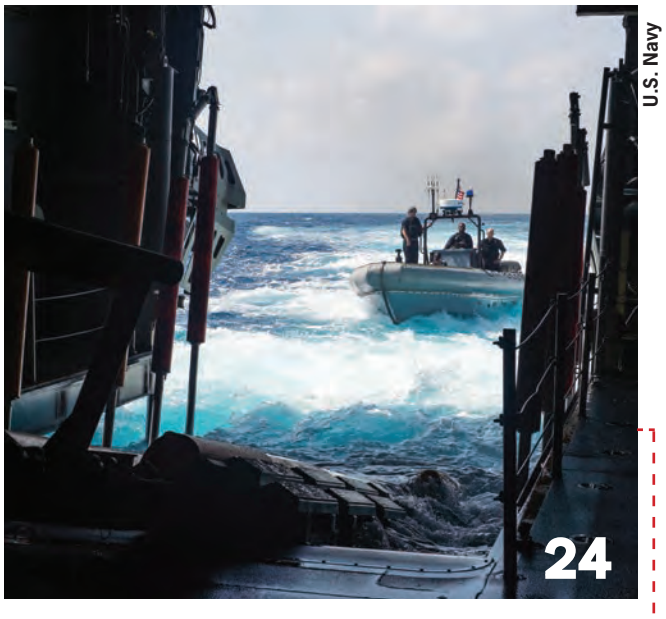
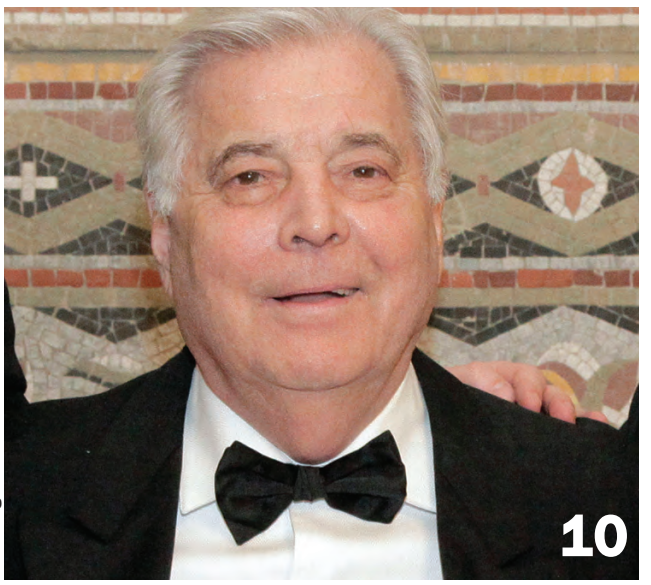


U.S. Navy

(Photo: Haig-Brown photos courtesy of Cummins Marine)



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By Edward Lundquist

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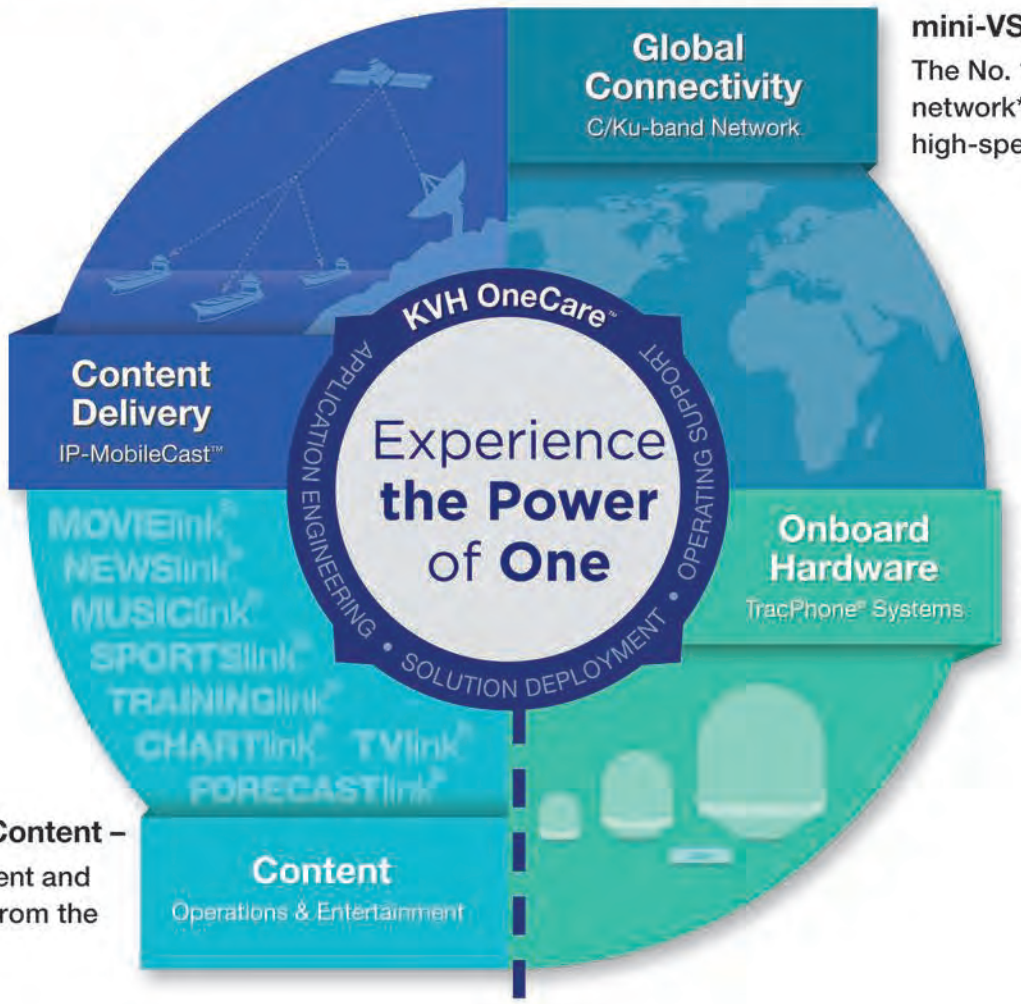

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Carnival Vista, scheduled to start operations in May 2016, will be the largest ship in the Carnival fleet at 133,500 tons, 1,055 ft. long with a guest capacity of 3,954. As one might expect, the ship is packed with next-gen amenitites, from a suspended cycling experience called SkyRide and the Family Harbor staterooms and suites featuring a "family concierge" to cruising's first IMAX Theater and the line's first onboard brewery.

Image: Carnival

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The era of "Big Data" is upon us in the maritime sector and from cruise to navy to unmanned systems, no sector will be left untouched.

By Henrik Segercrantz

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Pictured: Intelsat 29e, the first of the Intelsat EpicNG high throughput satellites, was launched aboard an Ariane 5 vehicle.

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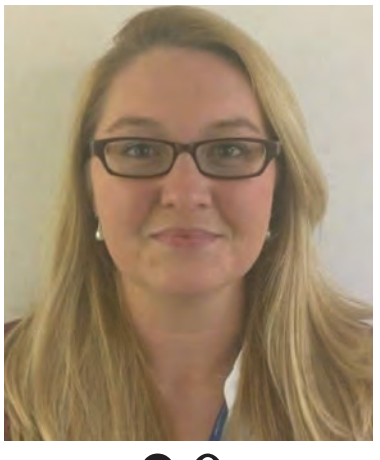

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From 'Big U' *to 'Big Data' ...*

GREG TRAUTHWEIN, EDITOR & ASSOCIATE PUBLISHER

While I've sat in this chair for more than 20 years, the one and only "news guy" thing I've never done but always wanted to do is yell: "Stop the Presses!" We came very close this month, when in early February news broke that Crystal Cruises, led by **Edie Rodriguez**, President and CEO, has come to the rescue of the legendary SS United States, a much beloved ship with a long and rich history, a ship that came from the mind of renowned naval architect William Francis Gibbs, a ship that last sailed more than 40 years ago and has sat dockside in varying degrees of disrepair. The story on the SS United States is long and well-known, starting with its coverage in the July 1, 1952, edition of Maritime Reporter, and most recently the February 2014 edition of our magazine in celebration of our 75th year.

Most everyone I've met in this industry universally has a love, reverence or respect for maritime history, and the interest in old ships – particularly those with the stature of SS United States – is palpable. I'm paraphrasing here, but the best quote I've ever written about ship restoration projects goes something like this: 'Anyone who is smart enough to restore a 60-year old ship is also smart enough not to do it!' But sometimes conventional logic simply does not apply, particularly in the booming cruise ship sector where investment in the past could very well be a prudent investment in the future, as the upscale cruising crowd is generally older, wealthier and looking for a unique experience. In nine-months or so, when all feasibility studies are complete, we will know for sure if the estimated $700 million restoration of the "Big U" is a 'go.' Until then I look forward to covering its progress in print, and online at MarineLink.com. **Eric Haun's** initial report is found on page 12.

From "Big U" we look at "Big Data." All that those two small words entail for the maritime industry have been, and will continue to be a significant area of coverage this month and for many years ahead. Simply put the speed and reliability of land-based communication capabilities are finding their way to the seas, and the transformation is revolutionary in the way in which commercial boats and ships are designed, outfitted and operated.

Henrik Segercrantz offers an extensive feature on the maritime lift-off for Big Data starting on page 34, and I had an interesting conversation with **Tommy Konkol Dybvad**, Marlink's director of cruise and ferry services, on the history and evolution of high speed communications to and from ships, starting on page 38. This particular Marlink executive has more than 20 years experience in the field, and his perspective on the explosive growth of this service in the cruise sector – when only 10 years ago 512kb to 1MB was standard bandwidth on a cruise ship – to today, when Marlink can offer a 'Cloud of Bandwidth' effectively divided and managed by the ship owner, is certainly enlightening.

While the advantages of Big Data in terms of operational efficiency, crew and passenger amenities are undeniable, there is always a flip side. A short report (p. 47) from the North P&I Club warns of some of the downsides of big data, a topic of intense debate moving forward.

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Pirates, Politics & Protection

Like oil & water, they don't mix.

Joseph Keefe is the lead commentator of MaritimeProfessional.com.

For many businesses on the collective, global waterfront, it is going to be a challenging year for one reason or another. Hence, you can be forgiven for forgetting that it wasn't too long ago that the most pressing matter on the plates of blue water shipping executives was protecting the mariners that get deep draft shipping from point A to point B from the scourge of so-called 'pirates.' The romance quickly went out of that word as vessels were boarded in remote places like the Gulf of Aden, West Africa and then, in obscure places in the Far East. The Maersk Alabama episode brought the problem into the glaring spotlight, followed by a reasonably well done Hollywood dramatization that used the incident as the springboard for a full length movie.

Before that, however, the problem spawned entire trade shows, a cottage industry of private security companies specifically focused on the maritime sector and a broader discussion of what to do, why and how to do it. Those discussions continue today. Large, multi-national coalitions and navies put in place several patchwork fixes that did some good, but at the end of the day, showed that trying to kill ants with a 50 pound sledge hammer was at best ineffective. It still is. It's (in part) why the era of the 600-foot warship being the primary vehicle for maritime security is rapidly coming to an end.

By far, the most effective means with which to deal with the 'piracy' problem turned out to be embarking small teams of professional, well-trained armed guards onto merchant vessels. That solution has worked quite well, by all accounts. Governments like it because it takes the financial burden off the taxpayers and foists it onto the shipping companies (who, presumably, when possible, pass it along to their customers). The shipping companies like it because it works. Correct me if I am wrong, but I am not aware of any merchant vessel that has ever been taken while private security was on board. Unfortunately, the costs associated with these services are predictably and prohibitively expensive and ultimately they impact the world's supply chain.

Leaving aside (for a moment) the root causes of piracy – off Somalia, most stakeholders would agree that it simply emanates from the ongoing lack of a functioning central government in that strife-filled region – the task of solving the end result of the problem merely masks the real issues that cause it, no matter where it happens. Nevertheless, when friends and neighbors outside the maritime cluster would ask me about the issue, their comments almost always went something like this: "Why don't they just put guards on board and shoot these criminals when they attack?" And, I would answer patiently, "It isn't that simple." To which they always replied, "Well, it sounds simple to me."

It isn't that armed security is a bad idea; actually it's a far better solution than putting the guns in the hands of the mariners themselves. Having sailed on a variety of merchant vessels, I don't think I'd be comfortable with a good percentage of the folks I sailed with being given arms. And, trust me on this one; you don't want me handling a loaded weapon. Sailing as an officer with the civilian-operated U.S. Navy's Military Sealift Command in the 1980's, I was aware that there was a gun locker somewhere on the vessel. I can't remember ever seeing it opened and I was glad of it. Over time, the best reason NOT to arm the crews might have come from an experienced U.S. Master Mariner who told me, maybe tongue-in-cheek, "I want the cook putting out a meal, not playing Rambo on the stern." But, I'm wandering off message here.

In the second week of January, the wire services reported that an Indian court had sentenced crew members of a U.S. vessel to prison terms of up to five years for illegal possession of arms in Indian waters. To say the verdict has inflamed regional and global politics would not overstate the situation. Reportedly, foreign nationals from Ukraine, Estonia and six former British armed services members were arrested in 2013 from the 'Seaman Guard Ohio' when they could not demonstrate that they had permission to carry weapons in India's water. 35 crew members are said to be involved, some of whom spent nine months in prison. Out on bail, they cannot leave the country.

According to Reuters, "The ship was operated by a U.S. maritime security firm and the incident highlighted the loosely regulated practice of placing guards on ships for protection against pirate attacks." "Loosely regulated" is one way to describe the practice, but in reality, the maritime security industry has arguably done a decent job in regulating themselves and ensuring that, in most cases, good standards and rules of engagement have been put into place. There are even voluntary international organizations that these firms can join and in turn be audited for compliance. All of that, however, doesn't solve the myriad rules and regulations unique to dozens of countries where these guards might pass through on the way to their assignments, or where the vessels themselves transit in the course of seagoing commerce.

What is currently happening in India may well be an unfortunate political spat, grossly unfair for the mariners and security personnel caught in the middle, but it shouldn't come as any surprise to anyone. And just because the Somalia geopolitical situation continues to be at best unstable, doesn't mean that other countries that do a better job with the rule of law shouldn't enforce their own laws – whether or not we agree with them, or not. On the other hand, until the problems ashore that lead to piracy at sea are solved, professional armed security for merchant vessels might just our best bet. Separately, some stakeholder reports now predict a spike in merchant vessel hijackings in high risk areas during the coming year. From where I sit, the practice of placing armed security on merchant vessels is still probably the best of many possible solutions to the challenge of 'modern piracy.' That doesn't mean there aren't some kinks to work out of the system. Beyond this and until a more international agreement on the rules for this method of protection can be standardized, then we are likely to see more of what just transpired in India. But that common ground may prove to be just as elusive as the solution to the root cause of piracy itself.

All of this is not to say that mistakes have not been made by armed security in the past. They have. That said; looking ahead, we may see more and more shipping companies reluctant to place security on board in certain areas. At the same time, more and more of the best security professionals may be leery of putting themselves in harm's way only to be caught in the middle of a similar diplomatic row. And, that just might translate into more ship hijackings.

Like oil & water; Pirates, Politics and Protection simply don't mix. We may have to change that reality. – MarPro.

Joseph Keefe is the lead commentator of MaritimeProfessional.com. Additionally, he is Editor of both Maritime Professional and MarineNews print magazines. He can be reached at jkeefe@maritimeprofessional.com or at Keefe@marinelink.com. MaritimeProfessional.com is the largest business networking site devoted to the marine industry. Each day thousands of industry professionals around the world log on to network, connect, and communicate.

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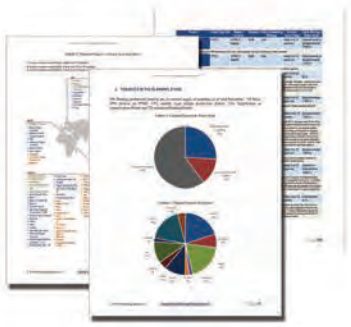

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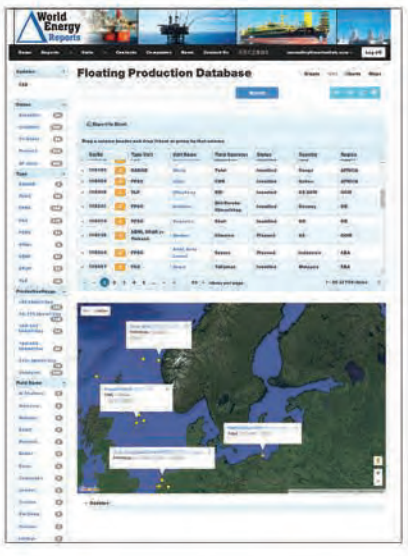

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Jochen Deerberg Retires

"An honorable merchant departs"

BY GREG TRAUTHWEIN

While the term 'pioneer' is oftentimes loosely bandied about, there is no more accurate term to describe Jochen Deerberg, an environmental pioneer of the maritime industry, founder of Oldenburg, Germany-based Deerberg-Systems, who was recently feted by cruise industry luminaries at his farewell dinner late last year.

"To start in 1979 one could see that environmental-waste management problems on shore and especially in the maritime industry would be of great importance in the future," said Deerberg. "Of course, I was 10 years too early with my idea. But this edge gave me the pole position for further future inventions.

In reflecting on his long career and impressive record of firsts, Deerberg was succinct in his assessment of how the cruise industry has changed most dramatically during his tenure. "(In) 1979, the investment for waste management for a ship with 2,500 persons on board was 300,000 Euro installed. This was oily water separator and sewage treatment plant. Today for waste management (solid & liquid waste), it is 3 million Euro installed."

Since his early days Deerberg was aware of the significance of waste management on ships, which he developed and continuously improved over the past 35 years. In that time his company grew from a start-up in a small camper to a market leader.

"Even setbacks let us emerge stronger. With a lean structure and our roots close to the heart we have always been working closely with our clients, with passion and dignity for continuous innovation," said Deerberg.

Ever diplomatic, Deerberg is remiss to name one particular ship his favorite, but he did note: "This is a difficult question. Deerberg is on 204 cruise ships and I cannot point out one. Eventually the Grand Princess of 1995 which was the ship where we delivered an integrated system solution for the first time."

At the end of 2015 Deerberg passed the key to the next generation. Deerberg-Systems is now part of Finland based Evac group, a global company with offices in over 40 countries that designs, manufactures and markets environmentally friendly water, waste and wastewater collection and treatment systems for the shipbuilding, offshore and construction industries. At the 30th traditional Deerberg Christmas party, a literal "Who's Who" of the maritime industry gathered at Oldenburg Castle.

Among the over 200 guests were the former CEO of Fincantieri Corado Antonini, shipyard owner Bernard Meyer, Costa CEO Michael Thamm, his predecessor Pier-Luigi Foschi, CLIA Europe-Head Dr. Raphael von Herman as well as friends, partners and colleagues of a long working life.

Jochen Deerberg, owner and managing director of Deerberg-Systems underlines in his farewell that today´s environmental consciousness, legislation, industries own initiatives and further developed technology induce the ship owners and shipyards to install a high standard, sustainable and flexible Waste Management System on board.

"A cruise ship will be operating for 30 to 40 years and must be totally flexible in handling the Waste Management Process onboard. Let's therefore always stay curious with the view ahead."

But even after leaving the executive role Jochen Deerberg will stay committed to the industry to support further development benefitting our environment with his expertise as visionary. He is also looking forward to spend more time with his family and his hobbies. And there will be more room for spending time in his Miami apartment. Always close to the industry he was so deeply involved with. When it comes to legacy, always humble Deerberg chose to quote others view of his work. Quoting Pierfrancesco Vago, Executive Chairman, MSC Crociere, from a letter datd 2/9/2015: "….With your pioneering vision, commitment and unshakeable determination, you took Deerberg-Systems up to the coveted position of market leader…." And quoting Michael Thamm, CEO Costa Crociere, from his Farewell Dinner on December 12, 2015 at Oldenburg Castle, " … He is one of the most remarkable and best known personalities of the cruise industry with an unmatched footprint set. An honorable merchant departs."

(Photos: Elke Röbken)

"He is one of the most remarkable and best known personalities of the cruise industry with an unmatched footprint set. An honorable merchant departs"

Michael Thamm (right) CEO Costa Crociere, said at **Jochen Deerberg's** (left) Farewell Dinner, December 12, 2015, at Oldenburg Castle.

(Photos: Elke Röbken)

Ljubo Jurisevic (Managing Director of Deerberg), Jochen Deerberg and Tomi Gardemeister (CEO of Evac Group Oy).

Working on the Norwegian Escape

(Photo: Almaco)

ALMACO Group delivered the first of Norwegian Cruise Line's Breakaway-Plus class ships, Norwegian Escape. The largest in Norwegian's fleet, the ship was built at Meyer Werft and delivered on October 22, 2015. ALMACO's scope for Norwegian Escape includes design, supply and installation of all catering-related equipment in the Galleys, Bars, Buffets, Pantries, Provision Stores and Refrigeration Machinery. The galleys feature ALMACO's GEM system (Galley Energy Management) that helps ship owners reduce the power consumption of the cooking equipment in the galley areas. Another technology delivered on this ship is ALMACO REM (Refrigeration Equipment Monitoring), which controls and monitors the refrigeration plants, provision stores and the galley refrigerators with one single system, allowing a full overview of the hundreds of cold consumers of the ship.

Norwegian Escape also features ALMACO PAC, or Precision Air Coolers, a proprietary design that achieves undisturbed airflow for an even temperature throughout the provision store with a reduced footprint. Due to the unit's configuration, less space is required for maintenance, freeing up more space for provisions. Additionally, PAC requires less cabling and creates energy savings.

(Photo: Almaco)

EMC, NCL Break Record for "Social Media Usage at Sea"

Norwegian Escape experienced a record-breaking social media milestone during its inaugural celebrations from October 22-November 11, 2015. Cruisers logged 576,896 Facebook posts, 14,150 tweets and 11,367 Instagram posts for a total of 159 million impressions, surpassing the cruise line's "social media usage at sea" record set during the 2013 inaugural events for Norwegian Breakaway, exceeded in 2014 with the Norwegian Getaway. The EMC advanced hybrid communications network of satellite-terrestrial-cellular connectivity allowed guests and crew to connect their smartphones and other devices.

(Photo: NCL)

S.S. United States

Historic Ship may get a Second Lease on Life

BY ERIC HAUN

(Photo: Eric Haun)

"We are ready to save history, full speed ahead" said Susan Gibbs (left). Gibbs and Edie Rodriguez, President and CEO of Crystal Cruises, announced plans to save the SS United States at a press conference in New York.

Crystal Cruises has come to the rescue of the historic luxury liner SS United States, announcing plans for an exclusive purchase option agreement to begin work on returning America's flagship to seagoing service, pending a technical feasibility study. Launched in 1952 as the fastest, largest and safest passenger liner in the world, "Big U" was regarded as an American symbol of elegance and technological prowess, capturing the transatlantic speed record on her maiden voyage and transporting more than one million passengers over her lifetime, including four U.S. presidents, international royalty and countless Hollywood celebrities.

Still the largest passenger ship ever built in America (and still the fastest cruise liner to cross the Atlantic), the ship is the brainchild of renowned naval architect William Francis Gibbs, who designed the SS United States as part of the U.S. government's secret Cold War era program that called for a high-tech passenger liner that could to double as a naval troopship in the event of war. As designed it could carry, if needed, 15,000 troops rapidly around the globe courtesy of a 240,000 shaft horsepower propulsion plant capable of traveling nearly halfway around the world without refueling.

Despite her celebrated innovation and grandeur, the ship has spent years mothballed at dock in Philadelphia in an escalating state of disrepair, last sailing under her own power more than 40 years ago.

The SS United States has seen a number of developers attempt to answer her SOS call since retiring from service in 1969. Now Crystal Cruises, together with the SS United States Conservancy (the group that presently owns the vessel and has led the efforts for her preservation) will work toward restoring the Big U's former glory, aiming to bring the ship into compliance for a return to oceangoing service.

The plan was announced at a press conference at New York's Manhattan Cruise Terminal on February 4, 2016, where Crystal Cruises said it will also take over the ship's maintenance bills while undertaking a nine-month technical feasibility study expected to wrap up by the end of 2016. The Conservancy will continue to own the vessel throughout the study. To facilitate the technical feasibility study, Crystal appointed retired U.S. Coast Guard Rear Admiral Tim Sullivan to build and lead a team of technical, legal and regulatory experts.

Before it returns to sea, the SS United States will require an extensive rebuild to meet modern demands and be in full regulatory compliance. The total price tag for the restoration is estimated at $700 million, according to Crystal president and CEO, Edie Rodriguez, who said she believes the SS United States could be ready to sail again as soon as 2018. A shipyard to perform the restoration work has yet to be identified as plans are in the early stages.

Crystal intends to transform the ship into a modern 800-guest vessel, featuring 400 suites with dining, entertainment, spa and other luxury guest amenities true to the ship's history. Many features of the original design will be retained, while new engines and modern marine technology will be installed. "[Revitalizing the SS United States] will be a very challenging undertaking, but we are determined to apply the dedication and innovation that has always been the ship's hallmark," Rodriguez said.

When asked what the project's largest challenges might be, Rodriguez said, "First and foremost, EPA issues. Environmental issues are paramount, so from my perspective that is just about the only thing that would break the deal."

But as has been the case for the many obstacles this ship has faced, determination can go a long way, as evidenced by executive director of the conservancy and granddaughter of the vessel's designer, Susan Gibbs, who has spent years working to preserve this piece of U.S. history.

"Crystal's ambitious vision for the SS United States will ensure our nation's flagship is once again a global ambassador for the highest standards of American innovation, quality and design," Gibbs said. "We are thrilled that the SS United States is now poised to make a triumphant return to sea and that the ship's historical legacy will continue to intrigue and inspire a new generation."

"We are ready to save history," Gibbs said, "full speed ahead."

Rendering of the restored SS United States by Crystal Cruises.

(Image: Crystal Cruises)

The July 1, 1952 edition of *Maritime Reporter* heralds the arrival of SS United States.

SS United States sits out of commission in Philadelphia.

(Photo: SS United States Conservancy)

Polar Expedition Vessel to be Built in Croatia

Bureau Veritas (BV) is to class a new concept luxury expedition cruise vessel to be built for Australia's Scenic group. The 165m vessel will be built at Croatia's Uljanik shipyard for delivery in summer 2018. It will have lower berth accommodation for 228 passengers and 172 crew and will meet the requirements of the newly adopted Polar Code allowing operation for a certain period of the year in Polar waters. All guest suites will have a private balcony and the ship will be equipped with a new generation of zero-speed high efficiency stabilizers. Two helicopters and an observation submarine will provide opportunities for a new approach to exploration cruises. Scenic Eclipse will be powered by two separate diesel-electric propulsion plants and two pods.

The vessel will be granted the highest Bureau Veritas marks and notations, including a new Polar Class and several additional class notations related to pollution prevention such as advanced waste water treatment system, ballast water management system, waste holding capacity and Green Passport.

Damen Takes on Viking River Cruise Jobs

Damen Shiprepair Amsterdam (DSAm) was working on a modification and maintenance contract for six inland cruise vessels owned by Viking River Cruises. With this winter service complete, all six vessels – known as longships – will be ready for the coming river cruise season. The Viking Idi was the first of the six to arrive at the yard in late December 2015. Sister ships Viking Idun, Viking Kvasir, Viking Kara, Viking Hlin and Viking Gullveig will follow consecutively. With each vessel spending an average of 10-11 days at the yard, the entire contract will be completed by early March. The primary scope of work for all six longships comprises stern frame modifications necessary to prevent propeller damage during turning maneuvers in canals and other narrow waterways. The solution is to install an additional steel construction reaching from the seawater inlet chest all the way to the stern. To reduce the time spent at the yard, Damen is prefabricating the steel components in advance.

The DSAm team will also carry out any necessary maintenance on the vessels while they have them in drydock. For example, the Viking Idi needed a replacement port propeller. Furthermore, the vertical sides of her hull and the seawater inlet chest box coolers were high-pressure washed and cleaned.

Response of a Semisubmersible Floating Turbine Foundation

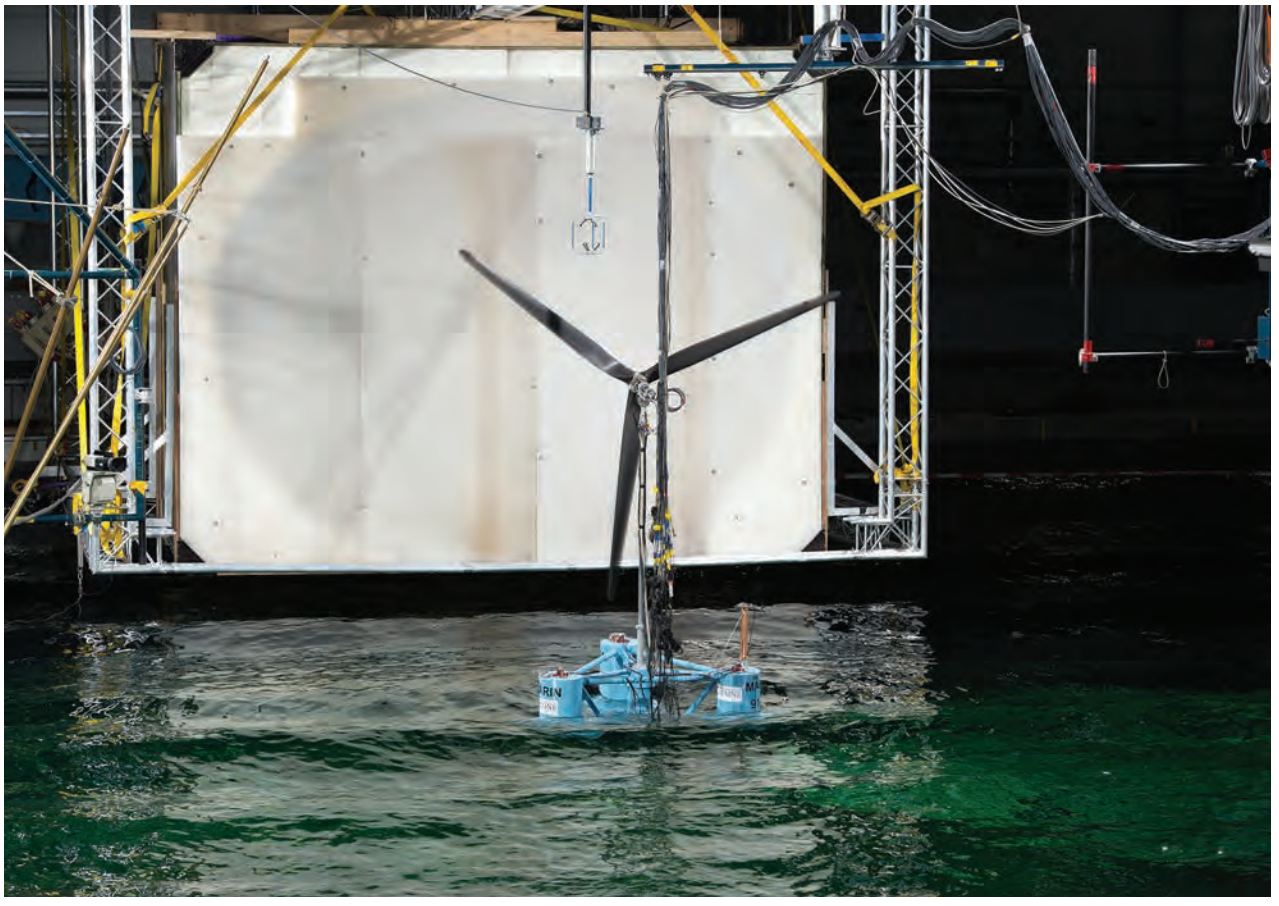
SEBASTIEN GUEYDON

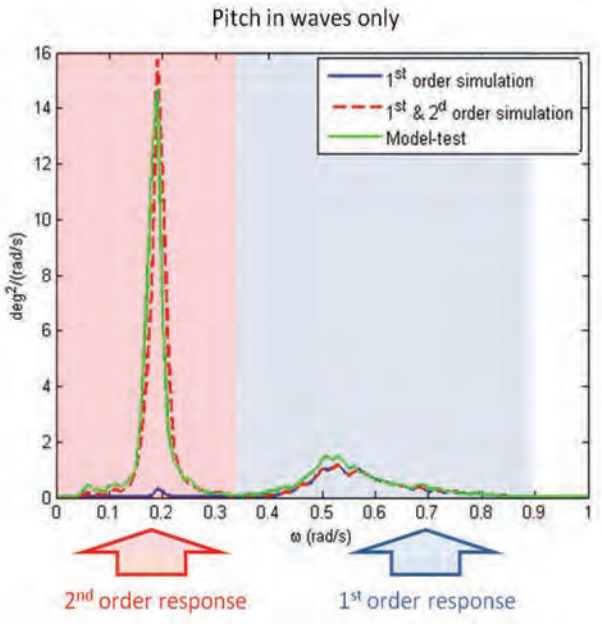
Floating foundations for wind turbines present some technical advantages, which is encouraging more and more industry players to develop new floaters.

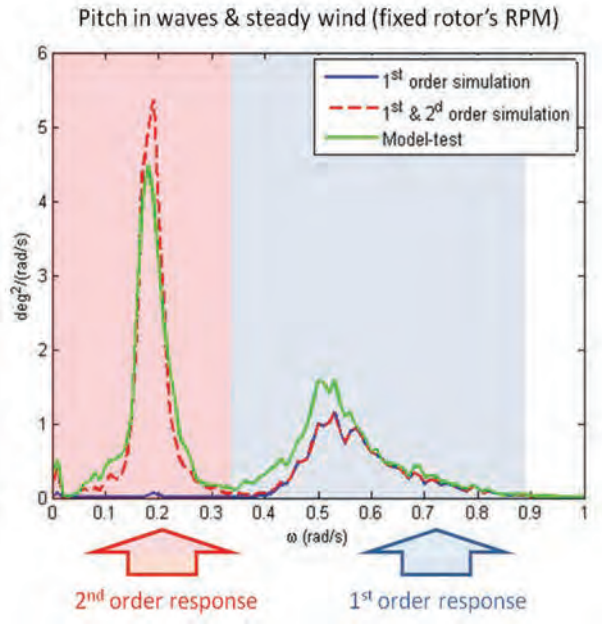
Firstly, they can be deployed in deep seas, independent of the soil conditions. Secondly, the installation and heavy maintenance can be done in sheltered areas, so that the whole OFWT can be towed directly to the wind farm's location by conventional tugs. However, floating foundations also bring new constraints on the wind turbine due to their motions in waves and wind. The combined use of model tests and simulations gives a better understanding of all the mechanisms at play.

Ideally, OFWTs are designed such that their natural periods are out of reach of the most energetic waves. Because waves and floater responses are not purely linear, it is useful to examine situations when higher order wave excitations are acting on the floater. Therefore, a study on the effects of second order wave loads on the floater's responses was carried out for a semisubmersible.

Second-order wave excitation resonant response peaks were identified in surge, heave and pitch from the analysis of measurements in waves. When the semisubmersible is exposed to wave only, the second-order response in pitch becomes the largest cause of inertial loading on the turbine. In wind and waves, the motions of the wind turbine are influenced by the wind loads on the rotor. This effect is particularly noticeable at the surge and pitch eigen frequencies, when it can potentially damp out the pitch response to second-order wave loads and beneficially reduce the inertial loads. Interaction between the loads on the rotor, the wind turbine controller and the motions of the floater are being thoroughly examined in the LIONS HAT Joint Industry Project set-up by MARIN.







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Maritime Cybersecurity

Learn to deter, detect and recover from cyber attacks

BY DENNIS BRYANT

The maritime community is no more immune from cyber threats than any other entity that relies on computers and the internet.

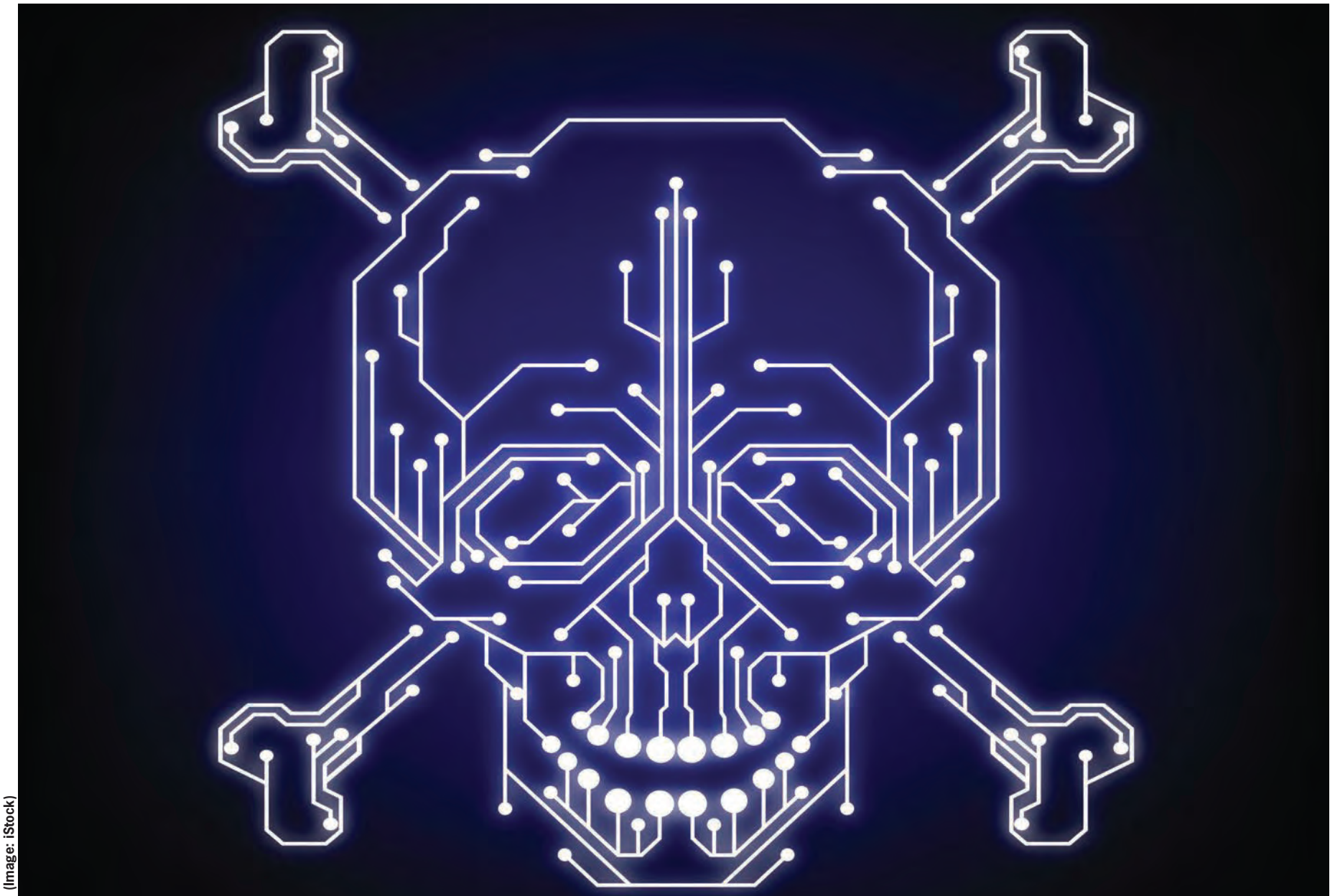
The maritime industry, though, constitutes part of the world's critical infrastructure. Thus, the consequences of a successful cyber-attack on a maritime entity could be far greater than a successful cyber-attack on, for instance, a bakery.

Consequently, it is important that the maritime sector and its numerous constituents adopt reasonable measures to deter, detect, and recover from cyber-attacks.

Currently, much of the world's attention is focused on terrorism. Cyber-attacks by terrorists are a real threat and steps must be taken to counter them. More commonly, though, cyber-attacks are launched by criminals, nation-states, and corporate spies. While the different groups have different motivations for cyber-attacks, the methodologies are basically the same – find a weakness and exploit it to gather information, steal monies or property, and/or disrupt operations.

While a robust cyber security plan may not totally stop a determined and sophisticated cyber-attack, it will cause most attackers to seek a softer target. Thus, the goal of a vessel, waterfront facility, or other maritime entity should be to have the best or one of the most robust cyber security plans available. A consortium of international maritime associations recently posted guidelines for cyber security onboard ships, intended to complement IMO requirements and company plans and procedures, while focusing exclusively on unique shipboard issues.

The US Coast Guard has been working diligently to enhance its cyber security plans and programs. In June 2015, the agency posted its Cyber security Strategy. It has also taken a number of steps to harden its communications and information technology (IT) structure.



(Image: iStock)

For several years, the Coast Guard has been urging the maritime community to adopt cyber security plans. The problem is that no two vessels, waterfront facilities, or other maritime entities are the same. Some have only very basic computer systems, while others have highly sophisticated systems with dedicated in-house IT staffs. Some have converted their operations to be heavily dependent on computerized coordination and interaction, while others use electronics only as an adjunct to traditional operations. Thus, one cyber security plan will not be able to address the myriad situations.

While it is vital that each element in the maritime sector adopt a cyber security plan, it is obvious that each cyber security plan be tailored to address the circumstances of that particular entity.

The Coast Guard has issued guidance to its field units and the Area Maritime Security Committees (AMSCs) regarding cyber security plans. In October, the House Committee on Homeland Security conducted a hearing entitled: "Protecting Maritime Facilities in the 21st Century: Are Our Nation's Ports at Risk for a Cyber-Attack?" A bill is pending in Congress that will, if enacted, provide the Coast Guard with specific authority to mandate cybers ecurity plans within the maritime industry.

The Coast Guard seems to favor the legislation, but at the same time believes that it has in the Maritime Transportation Security Act of 2002 (MTSA) sufficient authority to get the job done. A recent federal appellate court decision supports that position. In that matter, the Federal Trade Commission (FTC) brought suit against a major hotel chain alleging that the defendant's cyber security program was insufficiently robust to protect its clients against hackers. The hotel chain defended itself by asserting that, while the Federal Trade Commission Act prohibited "unfair or deceptive acts or practices in or affecting commerce", it provided the FTC with no authority regarding cyber security. Evidence showed that, prior to the litigation, the hotel chain had been the subject of at least three computer hacks in which clients' financial information had been stolen. The court held that Congress had given the FTC a broad mandate and that it was not inappropriate or unreasonable for the FTC to interpret that mandate to include cybersecurity.

A similar situation exists regarding the Coast Guard and the MTSA. In that statute, the Coast Guard is given responsibility of deterring and responding to a transportation security incident, defined as a security incident resulting in a significant loss of life, environmental damage, transportation system disruption, or economic disruption in a particular area. The MTSA also gives the Coast Guard specific authority to require covered vessels and facilities to prepare and submit for approval security plans that include provisions for establishing and maintaining physical security, passenger and cargo security, and personnel security; establishing and controlling access to secure areas; procedural security policies; communications systems; and other security systems (emphasis added). Given today's environment, there is little doubt at, if litigation ensued, a court would uphold the authority of the Coast Guard to require that security plans of covered vessels and facilities include a cyber security component.

The problem for the Coast Guard is, as noted above, no one cyber security plan will be appropriate for all vessels and facilities.

Thus, it is likely that any initial cyber security plan requirements adopted by the Coast Guard will be vague. As experience and capacity develops in this arena, those requirements will become more specific and meaningful. The maritime sector will, with encouragement and a little prodding, implement increasingly robust cyber security measures, further protecting itself from hackers of all persuasions.

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Continuous Improvement

Part 2 Implementing Continuous Improvement in Familiarization Training

BY MURRAY GOLDBERG

Continuous Improvement (CI) is the critical process of continually analyzing the performance of some aspect of operations, and then applying changes intended to improve that performance. This is the second in a series of articles intended to introduce practical tips for using CI to improve training effectiveness and efficiency in maritime organizations. Implementing a modest CI process for your in-house training is neither expensive nor difficult, and even a small program can produce a tremendous ROI in safety, efficiency, trainer engagement and trainee satisfaction.

This topic is especially timely right now. Vessels, equipment and job routines in the maritime industry continue to become more and more complicated and sophisticated. As a result, deeper knowledge and more specialized skills are required to operate safely. A program of continuous improvement for operational training is a necessary tool in the effort to close this gap.

In the first article of this series, published in the January edition of *Maritime Reporter & Engineering News (http://digitalmagazines.marinelink.com/nwm/MaritimeReporter/201601/)*, we introduced the application of CI to your organization's maritime job and familiarization training. In this article, we continue this series by talking about specific key performance indicators which can be used to measure training performance in your maritime organization.

Key Performance Indicators

Key Performance Indicators (KPIs) are the foundation of any CI process. KPIs are measurements used to evaluate effectiveness and efficiency. This is critical - as it is often said "if we can't measure it, we can't manage it". And while some people may be reluctant to gather training metrics for fear of what they may tell us, the only thing scarier than discovering unsafe training metrics is not collecting those KPIs in the first place. KPIs should minimally satisfy the following requirements:

- They must be aligned with corporate goals.
- They should react reasonably quickly to changes in training.
- They must track something you have some control over.

KPIs for Maritime Training

There are many KPIs which we can track to evaluate changes we make to familiarization training as part of our CI process. These fall generally into four categories:

1. Ask the trainee
2. Ask the trainer
3. Evaluate the trainee
4. Record performance

Let's look at some KPIs in each of these categories and discuss how they can help us improve training performance.

1. Ask the Trainee

Our students can be an excellent source of information. The signal to noise ratio can sometimes be quite low, but there will be good data there.

Probably the most common and obvious technique is to have the trainees fill out an evaluation of the trainer and the familiarization process. This evaluation can be used:

- by the trainer to help improve his or her technique.
- by training administrators for hiring and advancement, for optimizing train-the-trainer programs and to improve training practices and resources.

This is typically done at the end of training. But as a university faculty member many years ago I personally found it useful to hand out my own evaluation form half way through the term. This was personally beneficial in that I received feedback on a more regular basis. It was also beneficial for the students (trainees) because changes I would make to improve my performance would benefit the students who provided the feedback, not only the next year's group of students.

Another useful, though rarely applied, technique is to reevaluate the training 6 or 12 months after the completion of the training event. Once a seafarer has gained some on-the-job experience and had some time to put the knowledge and skills into practice, he or she may be able to provide a more informed and therefore more useful evaluation of the training. With the benefit of that experience they will be more able to comment on elements of training they feel were missing or were unnecessary. This can be very useful information.

2. Ask the Trainer

While many training organizations do collect some form of trainee feedback, it is much less common to gather trainer feedback in a structured and tracked way.

Trainers can be asked to comment on a variety of useful metrics including the preparedness of the trainees, the appropriateness training duration, the quality of the materials used to support the trainees during familiarization, the quality and appropriateness of the assessment techniques, and so on. This last question regarding assessments is a very important one. At BC Ferries where I am involved as the architect of the learning management system which supports their familiarization training, we find we receive a great deal of feedback on individual questions which are used to evaluate trainees. This feedback is critical in the process of continually refining the assessments to ensure that trainees know what they need to know, at the level required.

Another useful technique is to ask the trainers to perform self-evaluations. Ask if they feel they performed well during that training experience, ask what they could have done better, what new techniques they tried and found to be particularly successful, and what support they require to deliver a better experience next time. The additional subtle, but extremely important, benefit of this self-evaluation is that it causes

the trainer to reflect on the their training process and performance. It makes him or her a partner in training improvement. Otherwise, you are wasting a valuable thought resource because the trainer simply "works IN training", and is not as likely to "work ON training" - a key distinction.

3. Evaluate the Trainee

All organizations have a process in place to evaluate candidates at the end of training. The results of these evaluations can be used as a KPI.

A couple points on this. First - it is a good idea (and a common technique) to perform assessments not only at the end of training to evaluate the candidate, but also at the beginning of training to evaluate and improve the effectiveness of the training itself. There are many reasons for this pre-assessment. First, if an evaluation is conducted at the start of training, we are then aware of what the candidate "does not know" in addition to what they do know. By comparing that to the results of the evaluation conducted at the end of training, we can determine how successful training was even in the presence of candidates with varying degrees of knowledge and aptitude. Secondly, a pre-assessment also helps improve hiring practices and pre-familiarization self-study materials. Finally, pre-assessment results can be used by the trainer to tune his or her program to the candidates in hand, and to ensure that critical gaps in knowledge are covered.

Another excellent technique is to re-evaluate the candidate after some passage of time since the training event. This provides information on how well knowledge is retained over time. If critical knowledge is lost, then the training program can be altered to reinforce the maintenance of this knowledge and to recommend further training to individual candidates.

Finally, although all of these metrics are very useful, use caution in applying them without analysis and thought. Assessment outcomes can vary significantly with the method of assessment, with differences in the assessors, with differences in the candidates, and with the age of the assessment itself, just to name a few. So always think carefully about whether (or how much) a KPI is being influenced by actual effectiveness, or by the method of gathering the KPI itself.

4. Record Performance

Every organization has a system in place for measuring key aspects of operational performance. These can be mined for information that is directly related to your training performance. Any KPI that can be tied to a training event can be used.

One simple example is a KPI which measures the duration of familiarization training. Some organizations do not have fixed training agendas and vary the number of days of familiarization according to the candidate. This can be mined for very useful data. For example - has the number of days crept up over the years? If so – has performance improved alongside? Does duration vary according to the trainer? According to the number of trainees? According to the vessel? These are all important questions whose answers can provide insightful clues on how to improve outcomes.

Another example is the mining of loss or safety-related incidents. Statistics on these should be visited regularly in order to uncover common and recurring issues which can be addressed through a modification in training. Likewise for other operational metrics such as ferry loading and turnaround times, customer service complaints, and so on. There is a wealth of information that is already being collected (or can easily be collected) that can help improve training, and therefore safety and operational efficiency.

LMS-enabled KPIs for Maritime Familiarization Training

All of the KPIs spoken of above can be collected and analyzed manually. In addition to those, organizations that use a learning management system to support training have access to a variety of other deep KPIs which can provide insight that is simply not otherwise available.

In the March issue of *Maritime Reporter and Engineering News*, the final article in this series will discuss examples of LMS-enables KPIs and leading indicators which can provide incredible insight into training effectiveness.

The Author

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Modeling & Simulation

Not Only for Naval Combatants

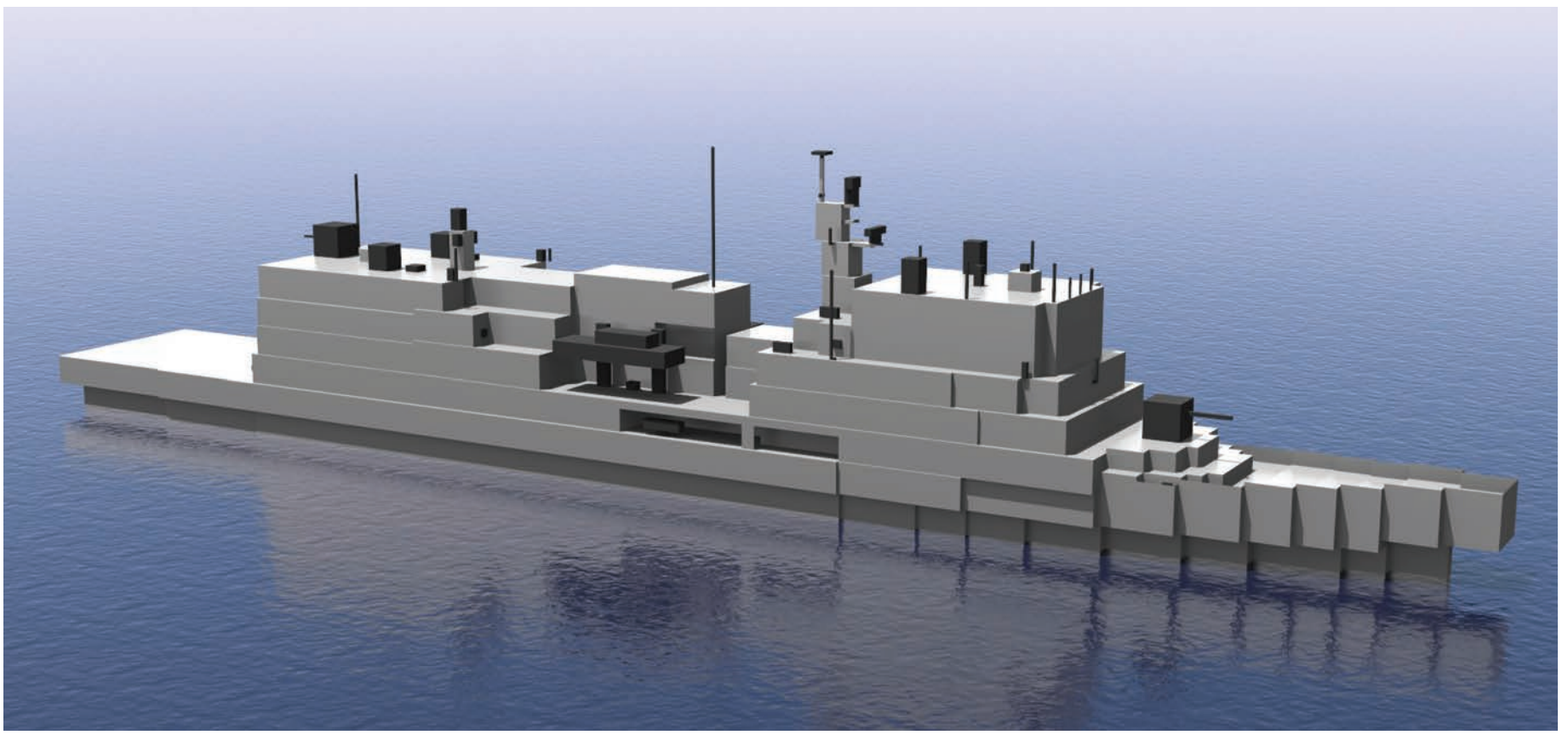
BY MAGGIE NATE

Throughout the history of naval warfare a consistent pattern has evolved between the development of anti-ship threats and the development of shipboard protective measures against those threats. Since the 1980's, the combination of ship-board protective measures has been colloquially referred to as 'survivability' and is defined more precisely as the measure of a vessel's ability to complete its mission after an attack. The measure of survivability considers one or more of the following aspects: susceptibility (the ability to avoid being hit), vulnerability (the level of damage when hit) and recoverability (the ability to recover from a given level of damage).

Total ship survivability requires a balanced and integrated consideration of the differing facets of ship design including signature control and self-defense weapon systems (susceptibility reduction) and post hit damage mitigation (vulnerability reduction and recoverability enhancement). The significant weight, volume and cost penalties associated with survivability features such as armoring or rapid-response damage control systems may often be outweighed by the simple fact that the probability of the ship getting hit by the threat is minimal. Consequently, an integrated probabilistic approach to the determination and evaluation of a measure of a system's total survivability is required in order to provide a true measure of mission capability and success. Integrated survivability simulation tools can be utilized to provide probabilistic representations of survivability by combining initial damage effects with recovery analysis into a single software suite that assists in survivability design, design evaluation, requirements assessment, and resource allocation. Thousands of tests are conducted with each test randomly varying extent and location of damage in order to capture the chaotic nature of random unknowns, thus providing a probabilistically determined assessment of occurrences similar to a real world threat event.

While historically the enhancement of ship survivability has been primarily associated with naval combatants; as the role of modern naval non-combatants evolves to include additional missions, and as the possibility of asymmetric threats places these ships at increased risk, the assessment of survivability of non-combatant ships becomes necessary to ensure fleet-wide mission capability. The design of "multi-mission ships" and emphasis on fleet-wide standardization has advanced survivability practices on both combatants and non-combatants in the 21st century. Additionally, it is important to recognize that damage can occur outside of a weapon impact. Fire initiation and flooding can be caused by overheated machinery equipment, faulty wiring, equipment cable sparking due to poor maintenance practices, repair activities such as welding or cutting, accidental hazardous material spillage, oil used in cooking, smoking paraphernalia or arson. Accidental flooding can be associated with hull breach due to a collision or grounding incident or deluged

Figure 1: 6,000 Ton Training and Hospital Vessel Simulated at Sea



pipe rupture from shock. Even with meticulous maintenance practices, situations like these can occur unexpectedly on both combatants and non-combatants alike and are vital to simulate to ensure the vessel is designed to withstand both accidental and intentional damage.

As a way to examine the quantifiable benefit of applying survivability practices to non-combatant vessels, Alion's survivability team performed a case study against a vessel with missions to act as a hospital ship during wartime and provide training and humanitarian support during peacetime. The 6,000 ton vessel was designed with an operating crew compliment of 120 and the ability to accommodate up to 320 total trainees and/or passengers. Primary missions of the vessel included Air Capable Ship (ACS) for medevac, Search and Rescue (SAR) through onboard boats or aircraft, and Medical support through sick bays. Although the ship was not expected to engage directly within a combat zone, it was required to also fulfill common combatant requirements for naval training purposes such as Identify Friend or Foe (IFF) detection, Anti-Surface Ship Warfare (ASU) engagement, and Anti-Air Warfare (AAW) engagement. It is important to note the assumption that the self-defense equipment listed here could be used with dummy detonators for training purposes or loaded with active charges to use in a wartime environment if necessary thus bridging the gap between a traditional combatant and non-combatant.

When considering the 3-D model of the case study vessel, structural elements were built using rectilinear mapping to allow for a rapid build time over traditional curvilinear modeling. Rectilinear mapping was still able to maintain simulation accuracy for such a large structure, in this case representing a total displacement within 7% of the as designed value while only requiring a fraction of the modeling time. Compartments were broken down into smaller Axis-Aligned Bounding Boxes (AABBs) to more accurately represent the spread of progressive damage such as fire and flooding throughout the vessel. The model was refined to include over 1,000 AABBs as shown in Figure 1 and over 7,000 structural plate elements, with associated stiffening and thermal insulation, in order to represent almost 600 compartments, with associated environmental conditions, fuel, and tankage loadings prescribed, within 4 Pressure Zones and 4 Fire Zones. Similarly, a total of almost 900 vital components and nearly 3,000 pipes and cables were modeled to provide functional connectivity between over 700 pieces of equipment as shown in Figure 2.

In order to properly assess the overall survivability of the case study vessel, the model was subjected to 1,000 impingements across four threats representative of intentional weapon impacts based on the dual nature of the vessel: a Man Portable Rocket, a Naval Artillery Round, and two Anti-Ship Missiles (ASMs) with each threat categorized as "over matching", "equivalently matching", or "under matching". A threat was defined as "under matched" if the vessel was designed to withstand an impact and still maintain full mission capability, as "equivalently matched" if the vessel was designed to withstand an impact and be able to return to port safely under its own power, and as "under matched" if the vessel was designed to withstand an impact and only be able to remain afloat. Additionally, nearly 20,000 collision scenarios of varying speed, displacement, and impact angle and 10 fire scenarios selected based on hazardous materials running through/stored in each compartment and the statistical likelihood of a dynamic event occurring on each space were also assessed for accidental damage.

While the survivability analysis of the case study vessel showed several areas for improvement based on a root cause analysis, including deficiencies providing power system recovery when capability is lost post initial automated reconfiguration, unsuppressed fire propagation and the effect on availability of routes for crew and passengers to safely egress to muster stations were among the primary requirement failures identified. This is particularly concerning in scenarios where the total number of passengers exceeds the minimum (120) number of crew members as is possible in inherent Humanitarian and Medical support missions.

The root cause of failure analysis discussed previously indicated that the case

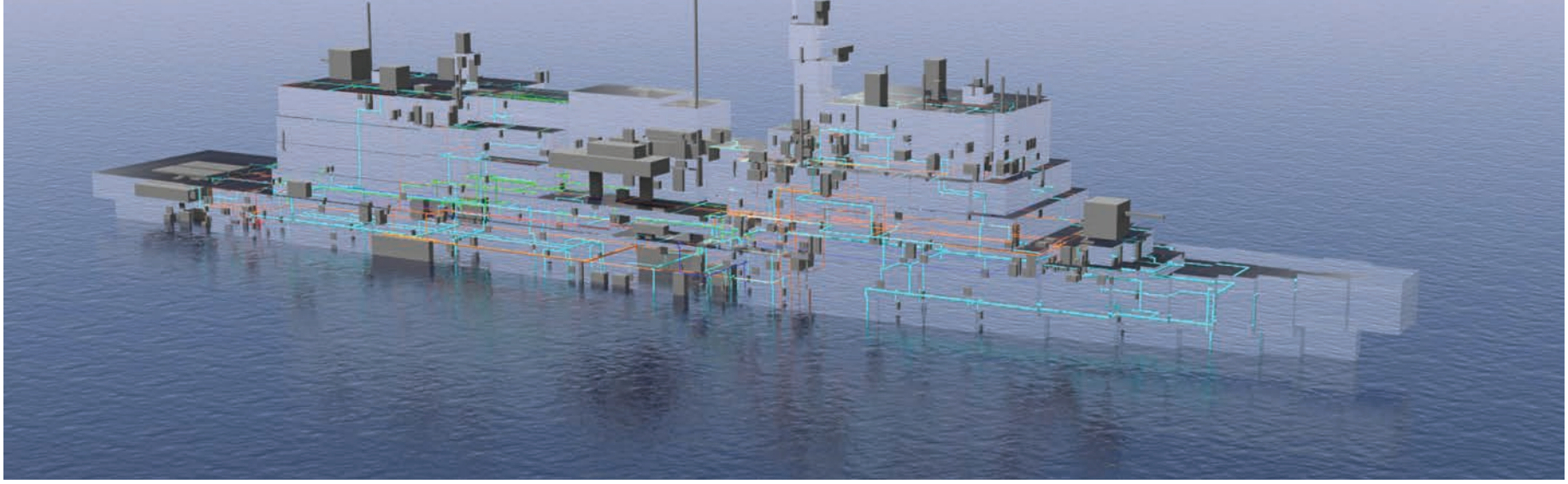
study vessel was unable to contain fire from progressing outside of the primary damage zone resultant from the naval artillery and ASM missile strikes without Man-in-the-Loop operations (i.e. manual firefighting). The naval combatant interpretation assumed that the Primary Damage Zone (PDZ) encompassed only the compartments directly influenced by the impact of the weapon – the compartment containing the hit location and any compartments open to the blast. However, the recent International Maritime Organization (IMO) Safe Return to Port (SRtP) as dictated by Safety Of Life At Sea (SOLAS) regulations, have defined the PDZ as any compartment within a vertical fire zone containing the weapon affect (i.e. the Main Vertical Zone or MVZ). To account for the IMO SRtP definition, vertical damage zones were superimposed and aligned with the water-tight separation and failure of the performance requirement was updated to "Fire Limited to MVZ". By modifying survivability performance requirement definition from the standard naval PDZ definition to comply with IMO SRtP (coinciding therefore with accepted practice for passenger vessels, hospital ships, and training vessels), the performance of the case study vessel increased by nearly10%.

This revised requirement definition for fire spread resulted in approximately 4% of threat weapon impacts breaching the vertical watertight zones thereby violating IMO Safe Return to Port (SRtP) regulations. Approximately 93% of IMO SRtP violations of the Fire Limited to MVZ requirement were due to the unmitigated progression of fire along breached passageways (e.g. fire initiated within a passage which then burns unmitigated across a non-tight boundary) as shown in Figure 3. In this case, a naval artillery impact breaches a command and control space, a pressure lock, and a collective protection system (CPS) fan room door initiating a fire in the starboard Main Deck Passageway. While Man-in-the-Loop Operation (MITLO) actions were not permitted in these analyses, it is important to note that this particular scenario resulted in loss of a "single point of failure" seawater firefighting branch to the deckhouse therefore severely limiting manual and installed damage control capability. Based on this limitation to immediately mitigate fire progression in the deckhouse, the ability for evacuation capability especially since all life boats are located on the deckhouse levels is also restricted. The average breach or flashover time from primary weapon damage compartment is approximately 5 minutes. Therefore, fire containment aboard the case study vessel is functionally dependent on MITLO actions and that limited manning is not recommended for this vessel.

As the case study vessel is a multi-mission ship, including hospital, training, and conference hosting capabilities, much of the service life will be spent with significant numbers of untrained personnel on board.

This makes express egress an important function of the vessel. Even if all personnel on board can safely egress, emergency evacuation is stalled if either the forward deckhouse or the aft deckhouse (where the lifeboats are located) is inaccessible. According to a National Research Lab study on the ex-USS Shadwell, the decision to abandon ship must be made within 7 minutes of fire ignition or flooding progression in order

Figure 2: Distributed Systems and Connecting Vital Components Modeled



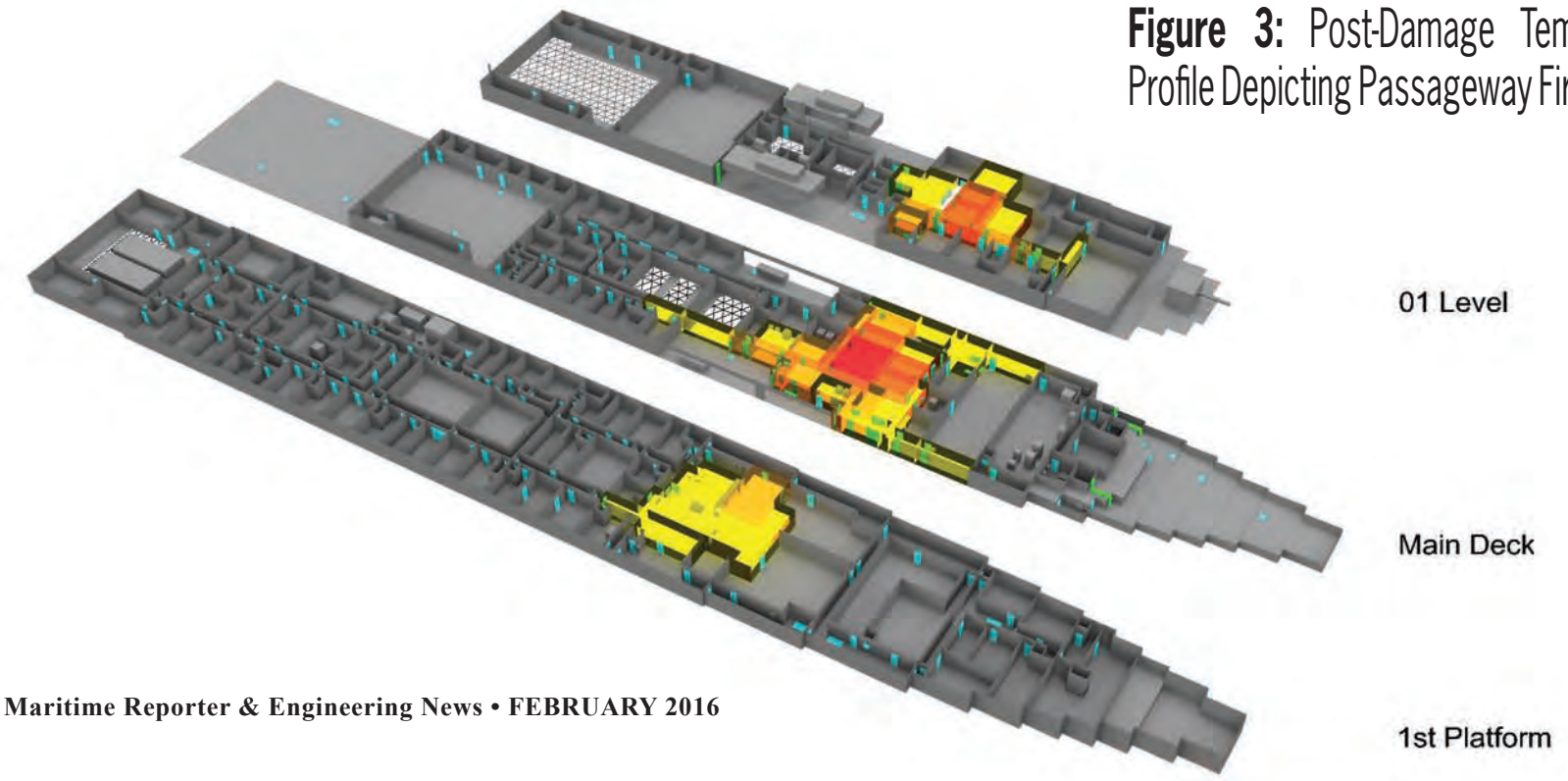


Figure 3: Post-Damage Temperature Profile Depicting Passageway Fire Spread

to ensure that all crew and passengers on board can egress safely because crew in spaces adjacent to a total flashover environment will become disoriented by 7 minutes. The installed casualty management system must have ample sensors and input, as well as a survivable layout, in order to quickly provide the command crew with the information needed to make a timely decision regarding abandon ship.

To investigate the egress and evacuation of the case study vessel, the post damage availability of egress routes from each of the \manned spaces as well as the lecture halls (which can pose a "choke point" problem in the event of an emergency evacuation) to any one of the six lifeboat muster stations was examined. Within this analysis, the condition of evacuation (e.g. do all passengers egress safely?) was not initially examined, however, the possibility of evacuation (i.e. does an unmitigated route to any lifeboat muster station exist?) was examined. Following the conclusion of the egress route availability assessment, a crew egress safety study to determine the condition of the evacuation (e.g. can all passengers egress safely given a damaged state?) was considered. For the crew egress safety study, the vessel was subjected to several weapon impact analyses affecting primary function and damage control performance requirement categories that would be vital to safe evacuation including Damage Stability, Fire Protection, Power, Propulsion, and Navigation.

Within the crew egress simulation based on the fire spread described above, crew and passengers were modelled in all accessible compartments as appropriate. In order to account for factors that would affect crew speed during evacuation such as; injury, littering, lighting effects, queuing effects, etc. an average crew speed of 0.40 m/s was assumed based on corrective factors as defined by the IMO. Additionally, a set time of 300 seconds (5 minutes) post weapon event was assumed as the time at which evacuation initiates also based on IMO guidelines. The average time to evacuate from any manned compartment to a pre-designated muster location was approximately 100 seconds, with the maximum time approaching 4 minutes (240 seconds). Based on the route check assessment and confirmed by crew evacuation study, the evacuation of the case study vessel post weapon impact initiated no later than 7 minutes post impact in order to reduce the probability of loss of life.

While the case study examined above was aimed to expand the application of survivability to vessels with naval non-combatant missions, the next step in this series is to examine the applicability of standards developed for mid-size naval surface vessels to other case studies such as small patrol craft, offshore oil platforms, passenger vessels, and/or modernizations from flight to flight. For example, is it worthwhile to replace a helideck with an infinity pool or replace UAVs (unmanned aerial vehicles) with semi-submersibles and repeat survivability simulations when operating in the same waters? With resources already available at our fingertips and the ability for thousands of analyses ready at the touch of a button, the answer, in this engineer's opinion, is definitely 'Yes'.

Originally presented at WMTC 2015, Providence RI, November 2015. Edited and reproduced with the permission of the Society of Naval Architects and Marine Engineers (SNAME).

The Author

Maggie Nate is a Virginia Tech graduate and former Aerospace Engineer turned Naval Architect. She has spent the past three years working at Alion Science and Technology performing survivability analyses on more than 10 domestic and international projects. Maggie is also the chairman and founder of SNAME's Technical and Research Panel SD-11:Post-Incident Safety Assurance and the Associate Editor for Survivability of ASNE's Naval Engineers Journal.

Navy Competes for Resources at home, against Asymmetric Threats Abroad

Commanders Look Forward to LCS in the Fleet

BY EDWARD LUNDQUIST

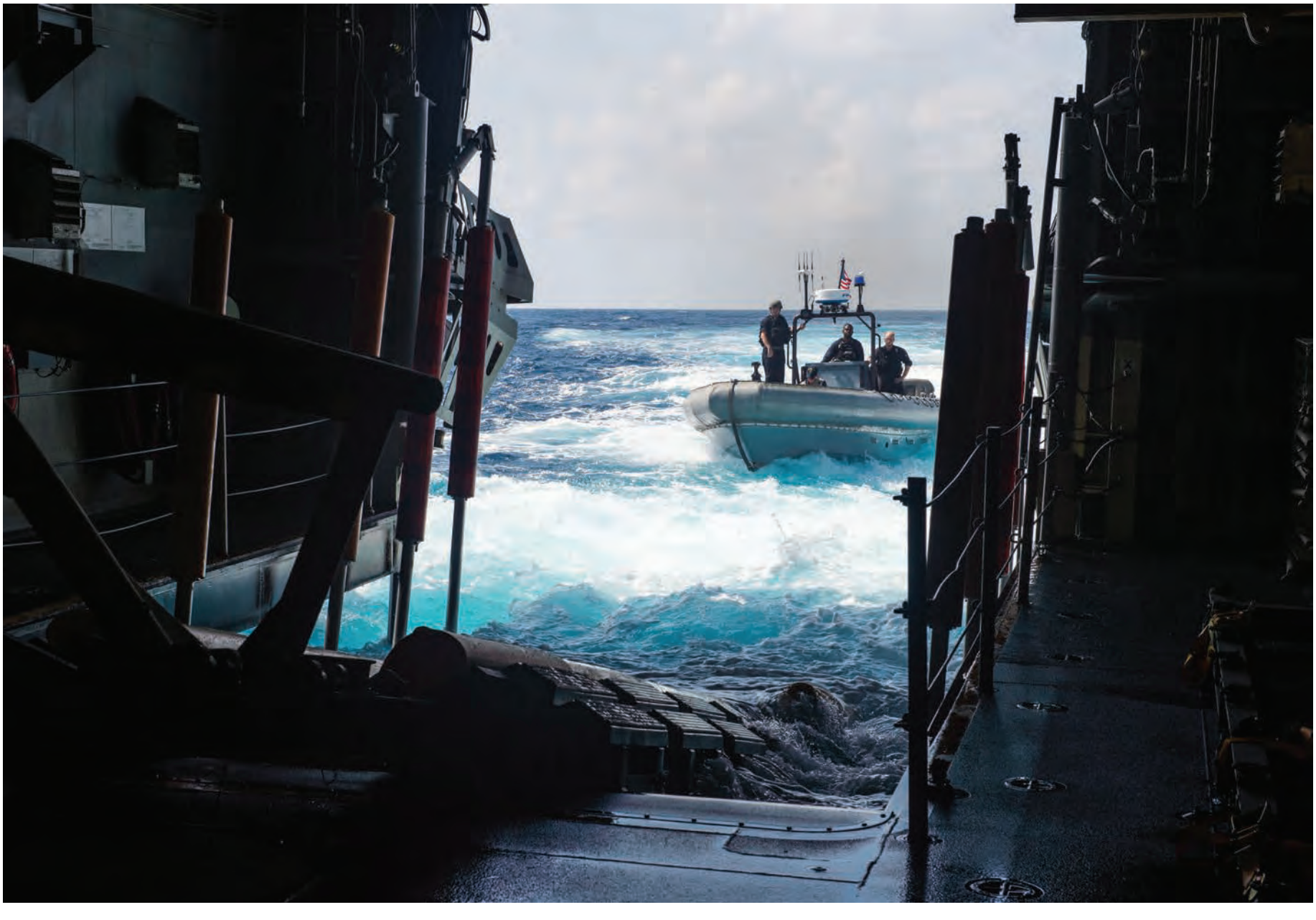
The U.S. Navy Chief of Naval Operations Adm. Jonathan Richardson recently released his "Design for maintaining maritime superiority."

The document presents Richardson's priorities with four "lines of effort" to strengthen naval power at and from the sea; achieve high velocity learning at every level; strengthen our Navy team for the future' and expand and strengthen our network of partners.

Richardson says the Navy must "maintain a fleet that is trained and ready to operate and fight decisively – from the deep ocean to the littorals, from the sea floor to space, and in the information domain."

It isn't an earth-shattering document, and perhaps is most telling for what it doesn't say, as opposed to what is says. The document makes a strong case for forward presence, which has been the raison d'etre for the U.S. Navy for decades. After three surface warriors in the CNO position (Admirals Vern Clark, Mike Mullen and Gary Roughead), the Navy is now led by the second consecutive submariner. Both Richardson and his predecessor, Adm. Jonathan Greenert, have made the Ohio Replacement Program (ORP) their top priority. ORP

An 11 meter rigid hull inflatable boat (RHIB) approaches the open stern doors of the water borne mission zone aboard the USS Fort Worth (LCS 3).



(U.S. Navy photo by Mass Communication Specialist 2nd Class Antonio Turretto Ramos)

"Sweepers, sweepers, man your brooms"

If you've been to sea, you've heard boson pipe followed by these words many times. "Sweepers, sweepers, man your brooms. Give the ship a clean sweep down fore and aft. Sweep down all lower decks, ladder and passageways."

*So that's what Maritime Reporter's naval affairs editor, retired Navy **Captain Ned Lundquist**, will try to do in our new quarterly column discussing military ship spending & trends.*

will replace the 16 active Ohio-class nuclear-powered ballistic missile submarines (SSBNs) with a new class of 12 submarines, all designed to keep the U.S. within strategic weapons treaty limits for launchers and warheads. The SSBNs are part of the nation's nuclear triad, which also includes land-based bombers and fixed missile silos. The ORP bill is expected to far exceed the Navy's normal shipbuilding budget, so some financial finagling will be required to have some kind of separate budget category.

It might seem that with such an expensive proposition, it might make sense to phase out the air and land based delivery systems, and put all the strategic weapons in the SSBN basket, as the submarines are the most survivable leg of the triad. The first replacement sub could enter service in 2021, but the program needs to get started now. In the meantime, the land-based ICBMs must be modernized, and the Air Force's long-range strategic bomber program has commenced, also a costly programs. And it may surprise you that some submariners argue against relying solely on the SSBNs. If the fleet of SSBNs were the sole delivery system of America's nuclear arsenal, then a potential adversary would dedicate enormous resources to counter it. With the triad, there is no single point of failure, and an enemy's problem is much more complicated.

The problem of paying for the strategic capability may come at the expense of conventional platforms. Even the sacrosanct aircraft carrier could be a budget casualty.

Defense Secretary Ash Carter's recently notified the Navy that it needed to cut back its plans to acquire LCS from 52 ships to 40. Such a move would seriously disrupt the shipbuilding plan, and reduce ships that are sorely needed to maintain forward presence, not to mention are uniquely capable of dealing with the asymmetric threats of mines, submarines and swarms of armed surface craft in the littoral.

"The Navy's strategic future requires more on focusing on posture, not only on presence, and more on new capabilities, not only on new ship numbers," Carter said in a letter to Navy Secretary Ray Mabus.

There is a balance between capability and capacity. Even the most capable warship can be everywhere all the time. LCS would be the platform most probably on station to provide visible presence around the world.

Distributed Lethality

"Even as these challenges become more complex, the character of the game accelerates forward and becomes faster and more challenging, as the competitors also become more numerous and more challenging," said Richardson, speaking at the Surface Navy Association's annual symposium in January.

The challenge of anti-ship missiles in and around the world's choke points has been compounded as new weapons are introduced, that are faster, have longer range, and may be more destructive, Richardson said.

"Our budget is likely to remain under pressure for the foreseeable future," Richardson said at SNA. "It's clear that we're not going to be able to spend and buy our way out of this. We've got to be thinking about new ways to do business."

The SNA symposium theme was "The Surface Warfare Strategy: A view beyond the horizon." Vice Adm. Tom Rowden's concept of "distributed lethality" to "increase the combat capability of naval surface forces," makes sense.

(U.S. Navy photo by Mass Communication Specialist 1st Class Jessica Bidwell)

Chief of Naval Operations (CNO) Adm. John Richardson speaks at the 28th annual Surface Navy Association Symposium in the Crystal City section of Arlington, Va.

More guns and missiles on more platforms changes the calculus. Rowden said distributed lethality aims to give naval ships better defensive systems as well as packing a bigger punch. Instead of an adversary focusing on the core of combat capability, the carrier, that adversary has a broader problem. Multiple platforms will be able to "deceive, target, and destroy."

"It's holding more adversaries at risk across a wider geography." Rowden said.

By changing the calculus of adversaries, Rowden said distributed lethality forces adversaries to "Wake up and say, 'Whew. I didn't see that coming.'"

The Real Mission for LCS

LCS has been mocked—unfairly—for its lack of combat power. The derision is based on the argument that LCS doesn't have the firepower or survivability of a destroyer or frigate—and those critics would be correct on that account. However, that's not what LCS was designed for.

Look at it this way.

The U.S. navy has no peer when it comes to open ocean "blue water" naval combat. The carrier strike group (CSG), with surface escorts and dedicated attack submarines, is the most potent combination of naval power afloat. If an enemy has the means to get out into the blue water to challenge the CSG, it will not prevail.

But all-out war in the middle of the ocean is a less likely scenario than regional conflicts, threats to commerce, and asymmetric threats in coastal waters or choke points. A number of nations have quiet diesel submarines or mines that can challenge combatants and threaten merchant shipping. And even a small, fast armed boat can be a menace, especially if there are enough of them—death from a thousand cuts.

These asymmetric threats are real, and can be employed by even the smallest nations, or worse, non-state actors. And compared to the middle of the ocean, the littoral waters of the world are complex environments with varying types of geography, bottom types, currents, temperatures, salinity. It's where the people live, and where commerce moves … and close enough to shore where adversaries of all types can get to.

If the challenge is to effectively deal with these asymmetric threats in littoral environments, specialized systems need to be used that can detect, track and destroy them if necessary. Dedicating high-value capital ships—which excel in the blue water—is a waste of their capability, and they would be ill-suited for the mission.

However, offboard systems could be employed where the host platform could remain outside the highest threat area and deploy manned or unmanned aircraft, surface vehicles or undersea vehicles to deal with those asymmetric threats of subs, mines, and surface craft. The capability would be reside in mission packages that could be changed based upon the threat. That's the LCS concept.

LCS wouldn't be alone and unprotected. It has a core capability for self-defense regardless of what mission package it carries, and, when appropriate, would be defended by larger combatants with their more robust multi-mission combat capability. If you had to develop up with a platform for these off-board systems, the result would be a ship with lots of volume to carry and operate the off-board systems, self-defense capabilities, and speed to get in and out of the threat area for launch and recovery. It should be relatively small, so you can build and operate a lot of them, so they can be present where needed.

The LCS image problem may be the result of the idea that putting together these mission packages into boxes and getting them to sea wouldn't be such a big deal. But it's taken more than a decade and the mine countermeasures and anti-submarine packages are still not ready for prime time. The only mission package that truly exists at present is the surface warfare package, a vastly simpler combination of surface and air assets, without the complexities of working underwater.

With the crowded field of presidential candidate wanting to criticize the administration, it has become fashionable to call for a bigger, stronger force, and more ships. These candidates are also calling for a reduction in federal spending, but they don't talk about how to pay for a massive defense buildup.

Far from Washington, USS Fort Worth (LCS 3) continues her deployment to the Western Pacific. She's been there for more than a year. Commander Logistics Forces U.S. Seventh Fleet Rear Admiral Charlie Williams says LCS has been embraced by our partners in the region. "Every nation that we are operating with wants Fort Worth and LCS to come to their country and participate in the exercise. Size-wise, crew size, and capabilities – LCS is a very appropriate ship for engagement in Southeast Asia."

Williams said that the Freedom deployment was very successful, "but she had some engineering reliability challenges that we saw that resulted in her not being able to make a couple of commitments. I would describe her deployment as a proof-of concept and a first deployment of a new ship class. We've had great collaboration between our 'man, train, and equip' side, as well as the operational elements, examining together the lessons learned, and going down the list and making sure that we did not repeat the same mistakes. So Fort Worth's deployment now is a great contrast to Freedom's deployment in terms of her reliability and readiness."

"At the beginning of Fort Worth's 16-month rotational deployment, she left San Diego for Hawaii, then to Guam and into Jakarta, Indonesia, before sailing to Singapore. She arrived here the day after the Air Asia flight went down in the Java Sea. She had a long-planned maintenance period already in place. But for quite obvious reasons, we delayed that maintenance and turned Fort Worth around, than placed a mobile dive and salvage unit and capability on board Fort Worth, and she got underway and headed straight to the Java Sea, and in less than 24 hours was reporting for duty, and ready to conduct search and rescue operations. It's a great example of the reliability, because we were able to delay that maintenance until she came back almost two weeks later.

Williams is thinking ahead to 2018, when four LCS ships that are slated to be rotationally deployed to Singapore

"I can envision a time during any month out of the year where we have one

of those ships doing an exercise in South Asia, perhaps with the Indian Navy or Bangladesh Navy. We would probably have one of the ships here in Singapore for maintenance. Additionally, with four ships rotationally deployed to this region, I think the math works out that we'll have a crew swap happening here in Singapore every month. Then perhaps there would be a third LCS in the South China Sea doing a routine patrol, like the one Fort Worth just completed, and perhaps a fourth LCS in Northeast Asia working with either the Japanese Maritime Self Defense Force (JMSDF), or with the Republic of Korea (ROK)," Williams says. "That's just a few years from now."

Vice Adm. Joseph Aucoin, who commands the U.S. Seventh Fleet, spoke at the Littoral OPTECH East 2015 conference in Tokyo in December 2015 discussed the difficulty for sensors, machinery, and platforms to operate in the littorals. "That's especially true for sensors when conducting mine countermeasures or antisubmarine warfare, and to be able to detect things underwater for power transmission, for connectivity and so forth. We need our best and brightest looking at this because the technology has a ways to go before we're as good in the littoral environment as we are in the air and space and other places."

OPTECH East was presented by the Naval Postgraduate School's Littoral Operation Center, along with the Office of Naval Research Global and the Japanese Maritime Self-Defense Force and the Swedish company Saab Electronic Defense Systems.

"We're learning as we get these new platforms out to sea. We're learning with USS Fort Worth. It has come a long way. Freedom was out here a couple years ago and it had issues as a brand new ship. We have learned a tremendous amount and Fort Worth's deployment is going much better than USS Freedom's a couple years ago, and so that does help us a lot in that regard. LCS is a good size for working with the other navies out here. For most of the countries out here, it's a comparable sized ship to their navy front line ships," Aucoin says. "So I'm very much looking forward to having four of them in Singapore, and additional LCS ships in the future."

(U.S. Navy photo by Mass Communication Specialist 2nd Class Antonio Turretto Ramos)

USS Fort Worth (LCS 3) arrives in Sihanoukville, Cambodia, for Cooperation Afloat Readiness and Training (CARAT) Cambodia 2015.

Safe Cruising Down Under with

Australian Reef Pilots

BY KATHY A. SMITH

Pilot launch "MALU MAI" with Carnival Australia cruise ship Pacific Dawn in the background.

Photo credit: Australian Reef Pilots Pty Ltd.

According to the Australian Reef Pilots (ARP), Australia is now the fourth biggest cruise market in the world. Part of the boom in cruising has to do with more specialty cruise ships coming to the region. The smaller size cruise ship segment seems purpose-designed to transit the remote waters of the Kimberley coast. However, larger-vessel cruise companies are now expressing interest in touring this remote and rugged north-west region as well as the Great Barrier Reef. In fact, the number of cruise ships using ARP's services has increased by more than 89 percent since 2010.

Last year, ARP saw record demand for pilots between Broome and Darwin, and expects 2016-17 will see the Kimberley coast enter the mainstream market.

In Northern Australia's Great Barrier Reef, the draft limit in the Inner Route – the passage that lies between the mainland and the outer reef between Cairns and Cape York – is 12.2 meters (40 feet). The maximum size of cruise ships that normally transit the area is approximately 265 meters (869 feet), which carry about 2,100 passengers. So passages like the Torres Strait can only be plied at certain times and at restricted speeds to control squat. "It's also necessary to pay careful attention during course alterations to minimize heel, and of course, for the comfort of passengers," says Captain Ian Perry, ARP Pilot and Pilot Trainer.

Captain Perry is one of 44 highly experienced ARP marine pilots who regularly shepherd vessels through the shipping channels of the Great Barrier Reef Marine Park. One of the most environmentally-sensitive regions in the world, the Reef is heritage-listed, and ARP are known as the unofficial Guardians of the Reef. In addition to offering pilotage through the Great North East Channel, Hydrographers Passage, the Inner Route, Torres Strait, Whitsunday Passage, Cape Flattery and 2 Mile Opening as well as other special cruise ship corridors, ARP also provides advisory services through non-mandated pilotage areas.

"Many of those areas outside of our compulsory pilotage areas are quite navigationally demanding with strong tidal streams, currents, and especially in the Kimberleys, which have a huge range of tides to 13 meters," explains Capt. Perry. "We offer this specialized knowledge of cruising grounds around Australia, not just the Barrier Reef. Some current surveys and charts are based on information that goes back to the 19th century, so additional information we can supply to the ship is important for these off-the-beaten-track places."

ARP has implemented a very robust and modern Pilotage Operations Safety Management System (POSMS), which was officially approved by the Australian Maritime Safety Authority in October 2014. A group of ARP pilots and management worked alongside well known and respected marine safety expert Captain Ravi Nijjer to research more than a century of accident reports from the Reef, as well as marine incidents from around the globe in order to put together a safety management system relevant to ARP operations.

Capt. Mike Allan at Smartship simulation training.

Photo credit: Australian Reef Pilots Pty Ltd.

The POSMS has since been augmented by a training framework which outlines how it is introduced and taught to new and existing pilots. This makes ARP the first pilotage company in Australia to have a fully integrated on-the-job training framework for its safety management system. Training involves on board real-life experiences with a licenced pilot and mentor pilots, as well as time with bridge simulators. The course is only for ARP pilots and is based on their procedures and systems.

The one-day internal training gives an overall induction to the Safety Management System and covers eight areas such as the philosophy of safety management systems, a pilot's role and obligation in coastal pilotage, Great Barrier Marine Park environmental information, weather and tidal information and marine incident reporting and investigations. The Standard operating procedures section covers 10 sub-topics, including compulsory pilotage limits, navigation chart requirements, go/no-go decisions, risk

Photo credit: Australian Reef Pilots Pty Ltd.

Capt. Perry (left) with Reef Pilot Capt. Colin Mcgrath and ARP Coxswain.

assessment, anchoring and emergency anchoring, and pilot embarkation and disembarkation.

A continual assessment of the POSMS ensures that the latest information is always relayed to every ARP pilot. Additional ongoing training that pilots must undertake includes courses such as a one-week advanced pilot training course, a one-day helicopter underwater escape training (taken every four years), and a four-day bridge resource management course. The Torres Strait and Great Barrier Reef simulation program developed by ARP and Smartship Brisbane (an Australian simulation center) helps fine-tune the POSMS in the challenging conditions pilots face when passing through the Prince of Wales Channel in the Torres Strait.

"We also attend advanced marine pilot training courses to develop skills and broaden experiences," says Capt. Perry. "Those are done with pilots outside of the Reef pilotage of ARP such as port pilots and other marine experts. It's a great opportunity to feed on other people's knowledge and for general improvement."

The two principal tenets of POSMS are error management and dynamic risk. The one-day training is typically given to groups of four or five pilots. "From that point on, you learn to use it [POSMS] and refer to it. It was written by pilots. It wasn't imported from elsewhere," said Capt. Perry.

Reef pilots can be challenged by myriad issues like sea conditions, extreme weather changes, tides, etc. Naturally they have to have a very good understanding of the rules and regulations that apply specifically to cruise ships as well as other vessels such as the landing of passengers in case of emergency, arranging port access, and the like.

Regulations are very strict when it comes to the discharge of gray water in Reef areas. All ships must carry a permit and pre-plan where to make an exit and re-enter the Reef, and ARP pilots help execute these additional legs, plan the logistics and suggest appropriate places.

Settling in on board quickly is crucial to a pilot's effectiveness, especially since the cruise ship must stay on schedule. And, of course, all aspects of the voyage must be pre-planned and covered well before the pilot gets on board.

"Becoming an accepted member of a ship's command team, being in a position to assist with a variety of things that do not normally arise in other shipping pilotage jobs, and mastering a great array of equipment can be challenging. We need to be familiar with many things."

Also considering the 500 miles of the Inner Route (the passage can be anywhere from 24 to 50 hours pilotage, depending on the ship's speed) with its series of short passages interspersed with more intensive pilotage sections, managing rest is essential for pilots. A fatigue management plan is also part of the POSMS. "It's essential to manage rest during the passage sections so

Capt. Perry (Center) going through some docs at the Cairns Pilot House with Capt. McGrath (Left) and Capt. Andrew Chai (right)

Photo credit: Australian Reef Pilots Pty Ltd.

Capt. Perry checking document with ARP Coxswain, Dave Swan

you're rested for the pilotage sections," said Capt. Perry. "If you can't manage your sleep, I don't know if you can do this job."

As a group, ARP is continually in a process of identifying hazard, assessing risk, taking action to eliminate or reduce risk and monitoring and reviewing the constantly changing circumstances. This is a key difference in comparison to port pilotage, as the ARP work in a much more time-extended environment.

Even with technological advances such as Portable Pilot Units, ECDIS, GPS, DGPS and better under-keel clearance management and monitoring, Capt. Perry stresses that bridge resource management is essential to minimizing human error. In fact, he thinks it is as significant as most technological advances.

"The challenges are still coming to grips with the role of the modern day pilot in terms of error management, particularly following what we've learned about the Costa Concordia accident," he told Maritime Reporter. "Cruise lines are committed to non-compulsory pilotage because they understand the additional assurance that it provides. It is part of their and our due diligence."

According to Capt. Perry, a number of pilotage organizations are copying or taking pieces of the POSMS program on board, for example at ports around Australia, including Fremantle, Cairns and Port Philip and elsewhere worldwide. ARP has also won several awards in the past few years and has been recognized by the Transport & Logistics Industry Skills Council (TLISC), with the 2015 Innovation and Excellence in Workforce Development Award in the maritime Sector for the competency-based training of its Pilot Boat Launch Crew.

"Our goal is to provide highly competent pilotage practices and have a depth of current local knowledge that can provide first-class systems to all ships, and of course cruise ships and their particular industry requirements," said Capt. Perry.

In total, ARP operates a fleet of six pilot launches and five land-on helicopters as well as pilothouses located in Mackay, Cairns and Thursday and Yorke Islands in Torres Strait. In addition, the group also provides Great Barrier Reef relief Masters, port pilots in Australia and New Zealand, towage specialists, marine surveys, and provision of charts, voyage management, launch operation and hire. "You might consider that at one time, a pilot's role in life was to protect a ship from the environment." says Capt. Perry. "Some pilots feel that we are now there to protect the environment from the ship. And I am certainly of that second school of thought."

ARP have been guarding the Great Barrier Reef for more than 125 years. The group has certainly seen changes over the decades in operational improvements and modern innovations, but some things never change. "The technical advances make life so easy," Capt. Perry sums up. "But you still have to look out the window."

Italy cruises on the crest of a wave

BY JOSEPH FONSECA

Traditionally, Italy's location and coastal development have continued to ensure the country a flow of income from its role as a strategic European hub in what has come to be known as the new "maritime century." The country boasts of having the largest ferry fleet, the twelfth most extensive merchant shipping fleet in the world (fourth in Europe), and the third biggest European fishing fleet, with the national maritime cluster generating 3% of GDP. But its growing cruise industry is being looked upon as the game changer to the gradual slump being witnessed in the other sectors.

Italy remains "one of the most important destinations, the market of origin for large cruise lines and a world leader in shipbuilding. The Italian economy, in Europe, has benefited the most from the cruise industry, with over €4.6 billion of direct business impact in 2014 and over 102,000 jobs involved in the sector (equal to around a third of the total in Europe," according to the "Economic contribution report 2015" presented by CLIA (Cruise Lines International Association), the organization that represents European cruise operators.

Already in the early 1900s the two shipbuilding centers of Genoa and Trieste were unrivalled players at world level building ships which already then stood out for their design, elegant interior furnishings and engineering solutions. Of the many ships built, the 'Rex' is worthy of special mention, as possibly the most famous, classical Italian transatlantic liner, the epitome of luxury and elegance. Built at Genoa shipyard, the Rex is remembered for winning the Blue Riband in 1933, having beaten the record for crossing the Atlantic, a record won by few other transatlantic liners.

While the shipbuilding industry, at a global level, began going through a period of transition, the cruise shipbuilding sector in Italy however, fluctuated but stayed strong. Fincantieri Spa, D'Apollonia, Rodriguez Spa, Ferretti Yachts, Azimut-Benetti, Leopard Yachts and FIPA Group are some builders who are established undisputed leaders in the world of shipping and marine defense. Helped by the specialization of Italian companies, which had the dynamism to build large ships, the state-controlled Fincantieri and luxury cruise ship maker T Mariotti this sector weathered various fiscal storms.

Fincantieri, the largest shipbuilder in Europe, after the acquisition of VARD in 2013 had as a group doubled in size to become the fourth largest in the world. The company builds both commercial and military vessels. It was Fincantieri to be the first in the 1980s to take up the opportunity of the new trend in the cruise tourist industry and it approached the market by drawing on its experience and the prestige acquired in previous decades as builder of transatlantic liners.

The Crown Princess, delivered in 1990, is perhaps one of the most beautiful ships of our time with its dolphin skyline evoking the sea, designed by Renzo Piano. This ship is the forefather of a fleet of over 50 cruise ships built by Fincantieri, flag bearers of technology and design, engineering capacity and creativity. The leadership gained with a distinctive product "Made in Italy," is the result of top quality and a privileged relationship with the best international customers.

Thanks to its constant attention to Research and Innovation, Fincantieri continually develops new generations of ships in order to follow, indeed often anticipate, demands from the market and ship owners. Fincantieri continues to serve all sectors of the cruise market with a wide range of vessels which includes Post-panamax and Panamax ships as well as medium-small super luxury vessels or ships for special voyage types (expedition cruise, etc.)

In 2014, the cruise industry in Italy did see a slump and it recorded growth well below European competitors. Last year although, the sector in Italy grew by 0.7%, against 2.5% in 2015. This slowdown in Italy has been considered "alarming," considering that competitors are gaining ground and growing at a much faster rate," said the CLIA report.

During the 12 months of 2015, however, the industry recorded orders for around 40 million of compensated gross tons, down 10-15% compared to 2014. In particular, demand of offshore rigs of all sizes has essentially vanished as a result of falling oil prices and the inevitable drop in spending on exploration & production by a majority of oil & gas industry operators. Though Fincantieri recorded first-half losses, hit by the offshore sector its revenues increased, mostly driven by cruise ships. The cruise shipbuilding boom is a positive sign for the Italian industry. Of 216 cruise ships built worldwide from 1990 until last year, 70 were built by Fincantieri.

Cruise tourism in Italy impacts all of the major aspects of the industry, including: ports of embarkation, ports-of–call, shipbuilding, ship maintenance, provisioning, sales and marketing and the staffing of cruise ships and administrative facilities. Fiscal and economic conditions in Italy during 2014 continued to constrain the growth in demand. In addition the contraction in deployed capacity has resulted in a reduction in cruise pas-

(Photo Courtesy Fincantieri)

Monfalcone Shipyard

Koningsdam of Holland American Lines undergoes Sea Trial

(Photo Courtesy Fincantieri)

sengers and crew visits.

But the potential responsible for Italy becoming a leading center for cruise ship construction in Europe is its being the largest cruise embarkation and destination market. Last year it benefitted to the extent of €4.6 billion in direct cruise industry expenditures, an increase of 0.7% over 2013. The fact is that the cruise industry enjoyed dynamic growth over a period of 30 years, driven initially by demand from North America and more recently by growing demand from Europe and the rest of the world.

Italian ports, led by Venice, Civitavecchia, Savona and Genoa, were European market leaders with 1.95 million passenger embarkations in 2014. Led by Civitavecchia, Naples, and Livorno, Italian ports also hosted 6.17 million passenger visits in 2014 making Italy the largest cruise destination in Europe.

Since the cruise ship order book peaked in 2007, new orders fell in each of the next three years. As a consequence, the growth in shipbuilding expenditures declined in 2008 and actual expenditures fell during the 2009–11 period. Despite the increase in the total order book during 2014 the contracts placed in Japan and potentially in China represent a threat to Europe's continued pre-eminence in cruise shipbuilding. According to government sources the Italian cruise industry will continue its move ahead having posted expenditures for newbuildings in 2014 at €1,201 million and for refurbishment at €127 million. There is no doubt that Italy will continue to retain its leadership position which it has maintained over the past 40 years.

BIG DATA

& big savings for Maritime Ops

BY HENRIK SEGERCRANTZ

We are on the brink of an **extraordinary revolution** that will change our world forever. In this new world **everyone, everything** and **everywhere** will be connected in real time. We call this the **Networked Society**, and it will fundamentally change the way we innovate, collaborate, produce, govern and sustain. The transport industry will benefit from this evolution

– writes the communications technology and services provider Ericsson, which recently has entered into strategic cooperation with both Inmarsat and Cisco

(Image: Laros)

The development of integrated fast on-line computer technologies, new satellite link capabilities, and efficient cloud storage capabilities of information have resulted in huge opportunities for utilizing vast amounts of data for optimizing all kinds of operations. In order to use this new technology leap, global communications technology providers are entering into strategic cooperation. There is a growing number of companies specializing in providing consultancy and software services aiming at lowering their clients' energy bills. Within the maritime industry the focus is on optimizing shipping operations to save costs.

There is already now a huge amount of data potentially available within the maritime industry, considering the number of ships carrying vast amounts of goods to and from the numerous ports worldwide. To date, only a fraction of this information is used, but times are changing.

In December, ClassNK reported that it had established a Ship Data Center in Tokyo to support the utilization of data gathered from ship operations. Regarding the big amount of ship data today being gathered, the company reports, 'However, the approach to data capture is still very fragmented with similar data being sent to several vendors and analysis still being carried out almost entirely on a ship-by-ship basis. To make larger gains, an effective platform capable of centralizing and managing such diverse data is essential. ClassNK's Data Center though starts small, with trials using one container vessel. The Data Center is to serve as an information hub to independently manage the utilization of big data in the maritime industry. It aims at maximizing the benefits of big data for the industry with minimum cost and burden, such as the annual monitoring, report and verifying of fuel consumption for vessels 5,000gt or larger which call at any EU port, under the Monitoring, Reporting and Verification (MRV) regulation by the EU required from 1 January 2018.

The number of companies offering high-level technologies for optimizing ship operations is increasing. A pioneer was Finnish Eniram, soon followed by ABB, with its EMMA, and also, as in the example above, by similar technologies developed by ship classification societies. Sophisticated technologies developed by companies like Laros, from Greece, and GreenSteam, from Denmark, pave way for growing ship data markets.

Sensors are installed onboard to gather the data analyzed by software comparing it with optimal and displaying the data both onboard and sending it ashore, where increasingly sophisticated systems process and present it. All types of ship data is gathered, depending of the ship type at least including trim, speed and propulsion machinery and navigational data, up to recording hundreds of different data sources for sophisticated cruise ships, which also have completely separate systems looking into the consumer behavior and onboard hotel and restaurant business operations. The technical data is typically first processed by computers onboard comparing performance with pre-stored statistical ship data. Some pre-processed data is sent ashore to the shipowners' office for further analysis. Typically also the system provider receives the data in order to be able to process it further for the ship-

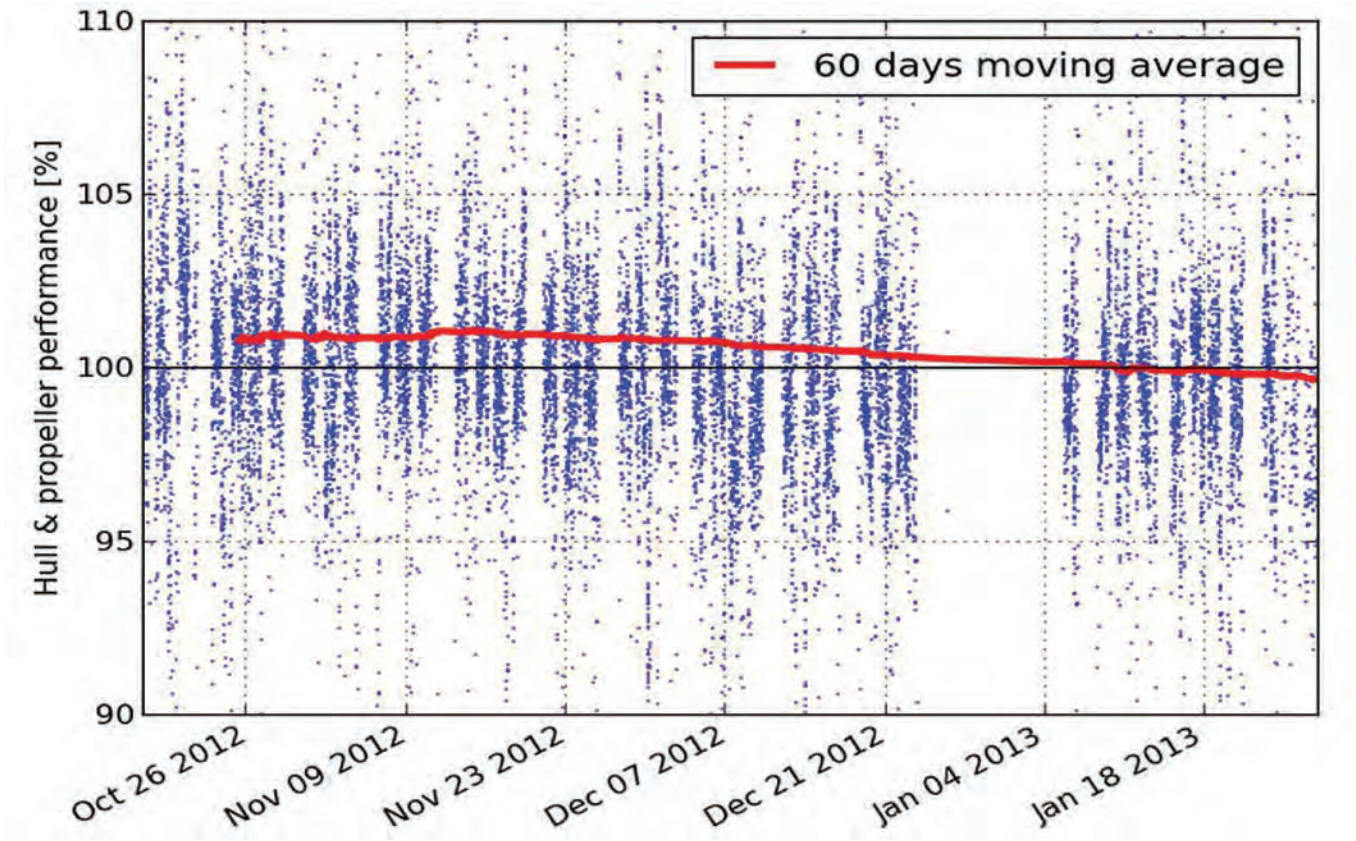
owner. The trend is towards sophisticated systems where data processing is automated as far as possible.

Eniram, established in 2005, has its system installed on some 250 ships already, many of them sophisticated cruise ships. Increasingly focusing on its Analytics Services, the company can provide more insight in the performance of the vessels and the fleet, such as the fleet budget follow up. From the cumulative database gathered one can extract trends, correlations and even develop new products. Ship specific tasks include, for example, looking into the effects of changing the propulsion system, or the application of fresh hull painting on a vessel, comparing the data from some months before a dry-docking with data after the changes. The potential of detailed data analysis is huge. As an example, the four percent estimated annual savings from using Eniram's system onboard 12 of Royal Caribbean Cruises' cruise ships saves $12m annually. The goal is to reach 14% in energy savings.

Meanwhile ABB Marine recently set up its own Marine R&D laboratory (profiled in the November 2015 edition of Maritime Reporter & Engineering News) to bring together all of their offerings for the marine industry as well as the research and development work. The laboratory is to work also on its Integrated Operations, based on its commitment to the Internet of Things, Services and People, joining up the shore operations to what happens onboard. ABB's Marine Advisory Systems is continuously further developed. The ship data is also transferred to a cloud-based application providing forecasting and benchmarking across the fleets of vessels. The EMMA system was originally developed to cater for the need in the cruise and ferry sectors whereas another Advisory System brand, the Octopus Advisory Suite, was developed for handling specific needs within the oil and gas industry, within offshore work, and for optimizing the routes of cargo vessels, such as container vessels and LNG carriers, to provide a safe journey with minimized vessel motions and accelerations. On latest cruise ships more than 1,000 different signals are gathered.

LAROS

The ship information platform Laros, developed by Greek company Prisma Electronics Group, uses wireless communication between the sensors and the server onboard. The onboard data is sent ashore to the main data center as compressed binary data, either saved on the cloud or on a dedicated server. After analysis and data mining for different purposes, it is used by the owner and the charterers and authorities where applicable. "Key Performance Indicators are then produced from the data. This data needs to be presented to the right people in the right way, to fleet managers and ship owners through web applications or to use it internally or with the classification society through pdf or excel reports," Serafeim Katsikas, CTO of Laros tells Maritime Reporter. "The real problem now is that there is no dedicated and approved standard way to analyze data such as hull performance or operational performance of the ship. There are only the EEDI and EEOI," he notes referring to IMO's Energy Efficiency Design Index and Ship Energy Efficiency Operational Index. "This is what the maritime sector is running into right now. What will it do to handle all this data? Including the cargo control there are 2.5 million measurements per day, some of which are processed already onboard." Mr. Katsikas describes how their data today is automatically sent ashore through satellite links once every hour to assure all the data is transmitted, because of the satellite links. "In some places there is a problem with the connection. In a critical situation, such as in an accident



(Image: GreenSteam)

The huge amount of collected raw data needs analyzing to become useful.

this can be changed down to say every two minutes. As they are continuously sending up more satellites, maybe in the future the ship has direct access to the cloud computing or to the Big Data analysis system."

In two years time Laros has been installed in some 150 tankers, container ships and bulk carriers. The amount of data gathered by Laros is in total 1,188,000 measurements per hour. The data is though automatically processed, and accessed by a desktop computer and even a mobile phone, where critical information can immediately be recognized.

In order to be able to utilize this new type and amount of data efficiently, Serafeim said that changes ashore, among the shipowners, are needed.

"We are talking about changing the way they manage their ships and the way their company is operating daily. They need to build a new framework inside the company, hire an engineer that has a background in energy efficiency for example, and build a team around him, before investing in this type of systems."

Danish company GreenSteam has in two years reached commercial speed in its operations, with 40 ship installations under its belt, and claims a three months pay-back time for its system. Among references are such companies like Brittany Ferries and Smyril Line. "We see us as a company providing Big Data for marine fuel efficiency," said Daniel J. Jacobsen, CTO of the company. "The methods we use can be summarized under the definition of machine learning."

Vessel and fleet performance can be accessed from any standard browser, anywhere. Automatic alerts are given when attention is required.

Inmarsat and Ericsson in Strategic Agreement

In November, Inmarsat, the global satellite communications services provider, and Ericsson, the communications technology and services provider, announced they have signed a strategic agreement that is intended to facilitate the sharing of maritime cargo, logistics and vessel operational data to help streamline the maritime supply chain. The two companies will jointly develop services, solutions and applications to drive industry standards for satellite connectivity and application integration in the maritime industry. Ericsson will handle the distribution of Inmarsat's XpressLink, the combined L-band and Ku-band VSAT network for the maritime market to be extended to Inmarsat's new Fleet Xpress when it becomes available on the market.

"Everyone is talking about 'big data,' but eventually it is the deployment of applications onboard and the end-to-end management of integrated intelligence, that will ultimately change the way the maritime industry operates; making it more efficient, greener and unlocking greater value," said Ronald Spithout, President Inmarsat Maritime.

"With Fleet Xpress, the world's first mobile hybrid Ka/L-band high-speed broadband service, embedded in and enabling world-class solutions from Ericsson, we are re-defining maritime connectivity. This transformational agreement will open up opportunities for vessel operators and managers to capture intelligent data immediately," said Ronald Spithout, President Inmarsat Maritime. The agreement will pave the way for integration with Ericsson's Maritime ICT Cloud and global connectivity including both Ka and L-band. "We are happy that the reliability of the Inmarsat constellation of satellites and operational standards are recognized as the best fit in the Ericsson road map of integrated services," Spithout said. Ericsson believes that the Internet of Things has the potential to generate tremendous value for the maritime industry. "Partnering with the leading provider of global mobile satellite communications services is the best means of helping the maritime industry to realize this value. Together with Inmarsat we will jointly develop fully integrated services, solutions and applications, and work toward establishing maritime industry standards for satellite connectivity and application integration," said John Taxgaard, Head

(Image: Eniram)

Eniram's vision of a future touch screen display, showing various parameters of the entire fleet. This screen shows current sea state, with passenger satisfaction indicated on the left.

of Maritime at Ericsson.

Ericsson has developed the Connected Vehicle Cloud, which enables application developers, government organizations, businesses and automotive manufacturers to reach automotive drivers and passengers with services and information. Ericsson observes that shipping companies are increasingly investing in machine-to-machine communications, which creates a need for full mobile coverage onboard vessels, as well as cost-efficient, high-bandwidth connectivity over satellite links. "To make the most of this connectivity, shipping companies will need to modernize their ICT environments. The Connected Vessel concept is based on an open and horizontally layered model with solutions for connectivity, connectivity & device management, and service & information management," the company announces. Noting that at present ships rely on manually updated traffic, cargo, port, weather and safety information that is sent point-to-point rather than made available to all parties simultaneously via a network, Ericsson is introducing its Maritime ITC Cloud which will connect vessels at sea with shore-based operations, maintenance service providers, customer support centers, fleet/transportation partners, port operations and authorities. At the same time, the offering supports services used to manage fleets, monitor engines and fuel consumption, oversee routes and navigation, and ensure the well-being of the crew. Ericsson is to provide everything from satellite connections to application support in one complete package, and manage operation of the Maritime ICT Cloud on behalf of its customers. Ericsson's Maritime ICT Cloud solution connects vessels at sea to shore-based operations such as maintenance service providers, customer support centers, fleet/transportation partners, port operations and authorities. Enabled by Inmarsat, the Maritime ICT Cloud will ensure that trucks will spend less idle time at ports, cargo will spend less time in transit, and producers will be better able to plan their shipments, the companies announce.

In recent years Ericsson has supplied complete mobile satellite connectivity to ship fleets, such as the 400 container vessels of Maersk Line. Another 'key step forward' in Ericsson's 'company transformation,' as Hans Vestberg, President and CEO, Ericsson, puts it, is its recently announced cooperation with Cisco aiming at creating future networks combining the know-how of both companies. Ericsson will together with Cisco, leader in IP-networking, offer end-to-end leadership across network architectures for 5G, cloud and IP, and the Internet of Things. Ericsson expects this strategic partnership to generate $1 billion or more of additional sales by 2018 for the company.

Another high-end example of a company specializing in data processing is the technology company Maana, recently funded by over $14m by Chevron, ConocoPhillips, Intel and GE. Maana has come up with sophisticated algorithms analyzing and combining big data to find useful information automatically and come up with relevant conclusions which would be impossible to find manually.

Eniram has estimated that there are some 56,000 potential vessels in the world which have a potential to invest in their system, based on fuel consumption and achievable savings. There is still some way to go but with the efforts now invested by many, we will see the main world fleet monitored on our computer screens in a not too distant time frame.

Cruise Shipping is Sailing Toward a

Cloud of Bandwidth

As demand for bandwidth onboard modern cruise ships and passenger vessels continues to rise exponentially, in tandem with the diversity and number of devices simultaneously yearning for service, Marlink believes a 'cloud of bandwidth' solution – the purchase of bandwidth in bulk for an entire fleet, with management of bandwidth for each individual ship determined and managed by the shipowner – is the ultimate solution.

By Greg Trauthwein

"Ten years ago, before the smart phones and the pads were available, laptops were dominant and Internet Cafe's were a main feature on cruise ships and ferries. **Standard bandwidth at that time was between 512kb and 1MB.** Today, we can see that it has increased tremendously, from 10, 20, 30, and up to **100MB per ship**."

Tommy Konkol Dybvad
Director Cruise & Ferry Services, Marlink

MARLINK

Cruise ship design and outfit have evolved rapidly over the past 20 years. While the physical manifestations onboard a modern cruise ship are pretty easy to see ... from the massive size of new ships, to unprecedented shopping and eating experiences, to spectacular new entertainment amenities ... a more subtle yet equally important transformation has been the exponential increase in bandwidth demanded and available onboard. Bandwidth at sea has grown more slowly but parallel with bandwidth demand ashore, with demands from customers and crew, as well as demands from innovative new monitoring and control systems onboard as well as the business end of running the ship driving demand.

Marlink has championed a package which can loosely be described as a 'cloud of bandwidth,' whereby owners and managers buy bandwidth in bulk, and leaving the decision on bandwidth per ship to their discretion. The most interesting part of the service is the management aspect of the bandwidth, as an owner can take bandwidth from other vessels and increase the bandwidth of a particular ship – even for a short time – to manage anticipated increases in usage.

"This service is for companies with fleets," said Tommy Konkol Dybvad, Director Cruise & Ferry Services, Marlink. "Instead of contracting bandwidth per vessel, it is much more cost-efficient for the customer to agree on a bandwidth that is shared across the fleet, delivering cost-savings and flexibility. We already do this with several customers regionally, including Stena Line and Simon Møkster. They have a shared bandwidth across the fleet, and bandwidth can be

UNITED STATES BANKRUPTCY COURT • SOUTHERN DISTRICT OF NEW YORK

In re OIC RUN-OFF LIMITED and THE LONDON AND OVERSEAS INSURANCE COMPANY LIMITED Debtors in Foreign Proceedings.	In a Case Under Chapter 15 of the Bankruptcy Code Case No. 15-13054 (SCC)

NOTICE OF ORDER GRANTING RECOGNITION OF FOREIGN MAIN PROCEEDINGS, PERMANENT INJUNCTION AND RELATED RELIEF

NOTICE IS HEREBY GIVEN THAT, in connection with the petitions filed on November 16, 2015 (the "Petitions") by Dan Yoram Schwarzmann and Paul Anthony Brereton Evans (the "Petitioners"), in their capacity as the duly authorized foreign representatives, as defined in section 101(24) of title 11 of the United States Code (the "Bankruptcy Code"), of OIC Run-Off Limited (subject to a scheme of arrangement) ("Orion") and The London and Overseas Insurance Company Limited (subject to a scheme of arrangement) ("L&O," together with Orion, the "Companies"), the United States Bankruptcy Court for the Southern District of New York (the "Court") has entered an Order Granting Recognition of Foreign Main Proceedings, Permanent Injunction and Related Relief (the "Order) [Docket No. 18], which provides, among other things, that:

1. The proceedings respecting the Amending Scheme (as defined in the Order) in the High Court of Justice of England and Wales are granted recognition as foreign main proceedings pursuant to section 1517 of the Bankruptcy Code;
2. All relief afforded foreign main proceedings pursuant to section 1520 of the Bankruptcy Code is granted;
3. The Amending Scheme (including any modifications or amendments thereto) shall be given full force and effect in the United States, and shall be binding on and enforceable against any person or entity that is a Scheme Creditor (as defined in the Amending Scheme), including, without limitation, against such person or entity in its capacity as a debtor of the Company in the United States;
4. All Scheme Creditors are permanently enjoined from taking any action in contravention of, or inconsistent with, the Amending Scheme;
5. Except as otherwise provided in the Order or in the Amending Scheme, all Scheme Creditors are permanently enjoined from: (a) commencing or continuing any proceedings (including, without limitation, arbitration, mediation or any judicial, quasi-judicial, administrative action, proceeding or process whatsoever) against a Company or any of its property in the United States, or any proceeds thereof, or seeking discovery of any nature against a Company; (b) enforcing any judicial, quasi-judicial, administrative judgment, assessment or order, or arbitration award and commencing or continuing any proceedings (including, without limitation, arbitration, mediation or any judicial, quasi-judicial, administrative action, proceeding or process whatsoever) or any counterclaim to create, perfect or enforce any lien, attachment, garnishment, setoff or other claim against a Company or any of its property in the United States, or any proceeds thereof, including, without limitation, rights under reinsurance or retrocession contracts; and (c) invoking, enforcing or relying on the benefits of any statute, rule or requirement of federal, state, or local law or regulation requiring a Company to establish or post security in the form of a bond, letter of credit or otherwise as a condition of prosecuting or defending any proceedings (including, without limitation, arbitration, mediation or any judicial, quasi-judicial, administrative action, proceedings or process whatsoever) and such statute, rule or requirement will be rendered null and void for proceedings; and
6. In accordance with the terms of the Amending Scheme, all persons and entities in possession, custody or control of property of a Company or the proceeds thereof, are required to turn over and account for such property or proceeds thereof to such Company or the Scheme Administrators (as defined in the Amending Scheme).

Copies of the Petitions and the supporting documents and the Amending Scheme documents are available (1) on the Bankruptcy Court's Electronic Case Filing System, which can be accessed from the Bankruptcy Court's website at https://ecf.nysb.uscourts.gov/ (a PACER login and password are required to retrieve a document), (2) on the Petitioners' website, www.oicrun-offltd.com, or (3) upon written request to the undersigned counsel:

CHADBOURNE & PARKE LLP • *Attorneys for the Petitioners* • 1301 Avenue of the Americas
New York, New York 10019 • (212) 408-5100 • Attn: Howard Seife, Esq. and Eric Daucher, Esq.

Today, with the advent of Big Data, proper placement of a multitude of antenna's is a ship design consideration at the earliest stages.

moved from ship to ship based on itinerary, based on number of passengers and based on the season."

While Marlink has regional carrier references for this service to date, the company contends the ability to deliver massive bandwidth to the world's largest cruise ships globally with pick up steam quickly. And soon.

Away But Connected

From emails and texts, Tweets to Instagram, news trolling to video streaming, travelers want to digitally share and stay connected while on vacation. A recent survey by Cruise Lines International Association (CLIA) finds that cruise lines have introduced a host of Wi-Fi capabilities and offerings on cruise ships making it easier than ever before to stay connected at sea.

Following are some of the latest examples of Internet accessibility on cruise ships:

- **Minutes vs. Data** – Wi-Fi is more available on cruise lines than ever and the costs to travelers are steadily declining. More cruise lines are offering Internet services at reasonable prices.
- **Social Media Packages** - In addition to Internet packages, many cruise ships are offering social media specialty packages. Half the Carnival Cruise Line fleet now offers a social media package that allows guests to access popular sites like Facebook and Twitter for a flat fee of five dollars per day.
- **Internet Café** – Almost all cruise lines offer an Internet Café complete with pay-as-you-use options for guests to stay connected.
- **Loyalty Member Services** – Some cruise lines also offer Internet access for loyalty program members. Members of Royal Caribbean International's Crown and Anchor Society loyalty program get discounts on internet packages while cruising, for example.

Demands for bandwidth in cruise shipping are unlike any other maritime sector, as today's ships with more than 4,000 passengers and 2,000 crew are in fact small floating towns. Bandwidth demands spans from passengers seeking to stay connected for personal and business purposes; for crew welfare as well as the business and technical aspects of communicating ship to shore to keep this small town running efficiently and safely.

Cloud of Bandwidth: Drivers & Benefits

While the cloud of bandwidth concept could radically change connectivity aboard cruise ships and passenger ferries, from a ship outfit perspective, the new service load essentially comes down to number, size and placement of antennas. "Several antenna systems onboard are key, as the system uses multiple satellites, multiple frequencies and multiple spot beams," said Tommy Konkol Dybvad, Director Cruise & Ferry Services, Marlink. Today when cruise ship plans are initiated, the placement of antennas is planned from the start. Drivers for the service are multiple, and mirror trends in society as a whole which is increasingly connected wherever they are.

"It is obvious that data for passengers and crew is extremely important. Almost all cruise companies today are creating apps for smart phones and tablets, so people are connected with each ship," said Dybvad. "This will require more bandwidth. In staying connected, this is only the start. I expect in the future that – particularly with younger passengers – they will want to go into the cabin and expect to download video from YouTube, from NetFlix, or whatever they want." Drivers include:

1. Passengers: They are a customer's life. Social media, email, news.
2. Crew: Big bandwidth users, important for crew welfare
3. Connectivity as a Revenue Stream
4. Ship Management
5. Third Parties Use: Point of Sale terminals, ATMs, Monitoring systems for ship operations and equipment health, etc.

Historically, internet has been a profit-center for cruise ships, a cost-center for ferries.

"All passengers want to stay connected ... everyone seems to have a pad, a smart phone and perhaps a laptop," said Dybvad. "Personally I carry all three and use them as I travel around. Everybody wants to stay connected, and this presents a tremendous challenge to bandwidth."

Dybvad, whose professional satcom experience with the company spans back to 1993, gives a brief synopsis. The first cruise ship had 64, maybe 128 kb, and provided voice communications. This was voice communications with analog telephones and a data connection for the office ashore. "Ten years ago, before the smart phones and the pads were available, laptops were dominant and Internet Cafe's were a main feature on cruise ships and ferries. Standard bandwidth at that time was between 512kb and 1MB. Today, we can see that it has increased tremendously, from 10, 20, 30, and up to 100MB per ship."

The case for a cloud of bandwidth is illustrated in the case of Simon Møkster Shipping, which operates a fleet of 25 state-of-the-art offshore service vessels. Marlink delivers a Closed User Group (CUG), or a set amount of bandwidth for the fleet which can be allocated and re-allocated as needed by Simon Møkster. For example, if one of the vessels has onboard a group of its customer's engineers for an extended, multi-week deployment requiring seamless, continuous access to servers on shore, Simon Møkster Shipping simply diverts bandwidth from others in the fleet to a specific vessel in need for a set period. In the case of a large cruise ship, one might imagine a scenario where a specific ship is hosting a technology conference for a week, for example.

For cruise and ferry companies, internet is not only a profit center, but also a service differentiator. For example, ferry companies cruising the same route may use internet as a means to attract and build business with faster, cheaper (or free) internet. "You're just reallocating fruit among your fruit bowls. You need not go back to the fruit story every time you need more fruit in a bowl," said Dybvad.

Jan Michelsen

VP Maritime, Cobham SATCOM

Jan Michelsen is responsible for the global maritime satellite and radio communications business at Cobham SATCOM. He shares his insights on the status and future direction of satcom's penetration in the global maritime market.

Big Data: The phrase is everywhere, but what does it mean in maritime?

Using data in a structured way to optimize shipboard and land organization processes, thereby reducing the underlying cost base. Shipping has been around for more than 5000 years, it is also very much a culture change journey. However, the growing trend to leverage the gigabytes of data generated by shipping fleets has potential to seriously change the way that the world does business.

Why should ship owners take notice? More importantly, are they investing in the new capabilities?

If they don't their competitive advantage will gradually erode. Shipping is also being professionalized post the financial crisis. The private venuture funds that have moved into commercial shipping have a very different view on risk management and operational/supply chain optimization; data is a key prerequisite to support decision making and identify areas that can be optimized, removing inefficiencies, leading to cost reductions.

How is the Satcom industry turning this buzzword into a tangible reality?

By focusing on the capabilities and benefit that we bring to the table. (At Cobham SATCOM) we look at the entire solution life-cycle together with our partners and end-users. SATCOM is integral to shipping's use of Big Data and ICT in general but for the connected future to really become a reality, there has to be high availability of fast, reliable broadband on a global basis. We're nearly there in terms of services, especially with new High Throughput Satellites coming fully online for maritime users in 2016. In terms of the shipboard terminals, reliability is pretty much ingrained. Stabilization technology established in the early 90s ensures a satellite antenna can track a satellite when under six degrees of motion and today, we are working on incremental changes and holistic approaches to squeeze every last drop of reliability and performance from antennas of decreasing size. This behind the scenes work plays a part in making Big Data a reality for shipping.

What is Cobham's view on the changing maritime satcom landscape?

It is the era of smart shipping and the world of maritime SATCOM will be very different five years from now.

The maritime satcom picture is a complex one. In your estimation is it too complex? If yes, what can be done to deliver more clarity

Yes, we work with complex technology but Cobham is known for providing solutions to the most challenging problems. But it should not be complex to install or operate, so our R/D department continuously focus on how we can provide more value to the ship owners and managers and enhance the overall satellite terminal use-case.

An important thing to remember about SATCOM is that not everybody is an expert. This is why we try to keep it simple for the customer and end-user (where relevant). For instance, with SAILOR VSAT, one of the key goals in initial development was to simplify the procurement and installation process. We took the whole process and turned it on its head. Previously, all the components to bring VSAT on board a vessel came from several suppliers, which meant putting things together during installation and commissioning and then testing. The approach we introduced was to deliver everything needed, factory tested in a single box. This significantly streamlines procurement and installation, to some extent transforming VSAT to an off-the-shelf product.

Of course, we recognize the complexity of SATCOM and in contrast to the SAILOR VSAT approach, Sea Tel products are designed for non-standard vessels and installations. They are used for vessels with very special or particular requirements, where the number of users, flexibility and bandwidth required far outweighs that of a commercial transport vessel. Essentially, Sea Tel VSAT is the platform for complex, custom networks on cruise ships, offshore vessels or any other maritime vessel where a degree of complexity is required in the network configuration to provide specific, often high-end communication functionality.

The maritime market is cyclical, and several sectors are in the midst of historic lows. Looking at 2016 and beyond, where do you see opportunities?

It is a difficult question to answer. The maritime industry is either a user, producer/transporter of oil or both. But whether the underlying freight market is weak or booming, there will be plenty of opportunity for streamlining operational processes on board the vessels and we should not forget that the young generation of seafarers demand to have access high-speed data connectivity so they can use their many different devices to communication with their family and friends.

The maritime market is heavily regulated. What is Satcom's role in helping shipowners efficiently navigate an increasingly heavy legislative, and litigious environment?

Cobham SATCOM is part of the EU initiative Efficiency 2. This is driven by our desire to influence the maritime industry and ensures safety and efficiency goes hand in hand. The advances in ICT can act as a catalyst to remove some of the administrative burdens onboard ships to ensure that the crew use their time on what is most important which is running the vessel as safely as possible.

How is your company investing to ensure its presence in the market?

We are committed to serve the global shipping industry with sophisticated products for safety, operational and crew welfare applications to create superior value and a great future for all stake holders in the Cobham SATCOM Ecosystem. Of course, we always have one eye on the future, which is why our SAILOR ku-band VSAT antennas have been ready for Ka-band VSAT for nearly two years. This means that those users currently on a traditional wideband service can cost-effectively migrate to a new Ka-band HTS service without changing antennas. We believe this will be a significant thing for both maritime SATCOM service providers and end-users, who will have the flexibility to move to a different service without having to get all-new on board hardware.

What new can our audience expect from Cobham in 2016?

A lot of our focus will be spent together with Inmarsat to ensure that GX takes off successfully. But we will also focus on our new suite of navigational products, for example or new GNSS positioning receiver.

Unmanned Surface Vessels

From Concept to Service

BY JOHN HAYNES

Over the next decade the maritime sector is likely to see one of the largest changes since sail gave way to steam. Unmanned Surface Vehicles (USV) are now being considered for various marine roles and the drivers for rapid development are significant.

Unmanned or autonomous vessels have passed through the trial and evaluation stage and are now being adopted for civilian and military applications. The maritime sector now has the opportunity to shape technology developments from legislative and end-user standpoints.

As the maritime sector is often the last to adopt new technology it is important to identify genuine innovations from other transport sectors. The driverless car is being pioneered by some of the largest companies in the world including Google, and small unmanned aircraft are being considered as a delivery method for global retailers including Amazon. As these innovations pass through rigorous regulatory approval processes there will be wider acceptance from the public when they are adopted.

The military has already learned a lot about Unmanned Aerial Vehicles (UAV) and the systems required to operate them. During the war in Afghanistan the US went from a UAV inventory of 100 to 10,000 over a ten year period. There are several terms in use for unmanned aerial vehicles, including Unmanned Aircraft System (UAS) which has generally been adopted by defence and civil aviation authorities. UAS emphasizes the importance of other elements beyond an aircraft itself including ground control stations, data links and other support equipment.

The maritime sector has the opportunity to gain extensive knowledge from numerous civil aviation uses including aerial surveying of land and crops, search and rescue operations, inspecting power lines and pipelines, monitoring wildlife and delivering medical supplies to remote or otherwise inaccessible regions. Utilising fixed wing or rotor aircraft,

BAE Systems Unmanned RHIB with ASV Technology.

(Credit: BAE Systems)

the technology is usually referred to by aviation professionals as an Unmanned Aerial System (UAS) in preference to the military term 'drone'.

Beneath the surface Autonomous Underwater Vehicles (AUV) operate independently of direct human input. Remotely operated underwater vehicles (ROVs) are controlled by a remote human operator and tethered by an armoured umbilical cable that carries electric power, video and data. ROV technology was developed in the 1960's to perform deep sea rescue operations and recover objects from the ocean floor. The offshore oil & gas industry created work-class ROVs to assist in the development of offshore oil fields.

Small Unmanned Surface Vehicles Lead The Way

On the surface the COLREGS (International Regulations for Preventing Collisions at Sea) are a major and ongoing issue as mariners and legislators debate whether unmanned vessels can operate safely in the vicinity of manned vessels. While confidence is building in the wider shipping community a USV platform is required that will do minimum damage to another vessel if a collision should occur. Small, light vessels often with inflatable or foam collars, have tended to be used to prove the unmanned concept. Creating defined sea and waterway areas where unmanned vessels can operate will enable further evaluation of their capabilities.

The first adopted vessels are mainly in the sub 12 metre (40 feet) range. The vessel technology is mature in this size range with numerous hull forms to choose from. The sensor technology is also mature and aviation has proved that it can be fitted into relatively small platforms then deployed over long distances. These small, lightweight vessels are flexible enough to fulfil a number of roles, plus their size and weight characteristics enable them to be easily transported by road, rail and air. Lightweight advanced materials, including composites, for hull and superstructure are likely to become the norm as this enables the onboard technology or fuel payload to be greater.

Davit and crane lifting specifications plus storage space on mother vessels are important considerations that for now will keep USV dimensions similar to current deployed vessels such as ships boats. Launch and recovery is a challenge for any unmanned platform and this will be important when integrating USV activities with larger ships when underway. Launch is the easier part of the process but there is still the issue of releasing the USV and pulling away from the suction effect of the mother vessel. Recovery can result in damage from collision with the mother vessel. Potential solutions range from simple nets to sophisticated high tech capture systems.

Civilian roles include surveying, scientific research and pollution response. The likelihood is that the oil and gas sector will lead the adoption of this technology. As this industry is highly regulated and risk adverse this will raise confidence for the wider maritime community. Port security is likely to expand the use of fixed location CCTV and situational awareness technology to mobile unmanned platforms that can patrol specific locations or cover large areas of a harbour on a 24/7 basis in all weathers. Military roles include Intelligence Surveillance & Reconnaissance (ISR), target practice and mine hunting with a growing desire to explore all possibilities to keep personnel out of harm way.

Unmanned Boat Design and Systems Integration

The innovators of first generation USVs tended to use existing floating platforms ranging from plastic kayaks to RHIBs to accommodate bespoke electronics and controls in waterproof housings. Once command, control and communication had been proven the next generation of USV developers required bespoke craft to demonstrate task specific applications. From the naval architect and boat builders perspective there have been opportunities to adapt proven craft and for new designs which have evolved into the USVs that are available today. COTS (Commercial Off The Shelf) procurement is now driving many military and government decisions, therefore the objective will be to create standardised marine platforms that can easily be adapted to carry modular technology payloads as the vessels role changes. This may include switching vessels from unmanned to manned as the task requires.

As the industries of boat building and autonomous system development are so different, it is proving essential to develop strategic alliances to enable cost effective systems integration. The industry recognises that a key enabler will be getting the systems architecture right from the start. A well designed open architecture will provide a flexible and modular system that can be expanded incrementally.

U.S. based Liquid Robotics has a vision to instrument the ocean with fleets of networked, wave-powered ocean robots. Wave motion is greatest at the water's surface, decreasing rapidly with increasing depth. The Wave Glider's unique two-part architecture exploits this difference in motion to provide forward propulsion. Wave Gliders have spent over 15,000 days at sea with the longest mission covering over 9,000 nautical miles. The Liquid Robotics Open Oceans Partner Program is a global technology program designed to accelerate the creation, integration and deployment of new technologies and applications for unmanned

ocean systems. Building upon the Wave Glider, the world's first wave and solar powered ocean robot, this program offers participating partners a comprehensive suite of open integration and development tools. Gary Gysin, President and CEO of Liquid Robotics, said, 'We are bringing the open systems, rapid innovation model of Silicon Valley to a maritime world of special purpose systems. Working with our partners, we will create entirely new solutions for defense, commercial and scientific customers by opening up access to the world of maritime systems.'

Autonomous Vessels and the Ocean Environment

In November 2015 a brand new Marine Robotics Innovation Centre was opened in Southampton UK. Run by the National Oceanography Centre the centre will be will be a hub for businesses and technologists developing autonomous platforms with novel sensors that will be used to cost-effectively capture data from the world's oceans. One of the first occupants is UK based company ASV, a leading provider of unmanned vessels with more than seventy platforms in the field globally and a wide variety of associated payloads. ASV designs, builds and operates a range of platforms for industrial, scientific and military applications worldwide.

The first use of an Autonomous Surface Vehicle (ASV) to perform bathymetry for updating the US nautical charts for NOAA (National Oceanic and Atmospheric Administration Office) occurred in the Alaskan Arctic in the summer of 2015. Surveying alongside TerraSond's mother-vessel, the ASV collected data simultaneously on adjacent survey lines, effectively doubling the production rate. The ASV also surveyed by itself in areas too shallow and dangerous for the larger vessel to work. Tom Newman, President of TerraSond, said, 'This is a force-multiplier for data acquisition. Operated in a semi-autonomous mode, unmanned but supervised, one person can replace the three person crew it would normally take to operate a survey launch. It is definitely the future of seafloor mapping.'

Unmanned Capability Enhances Naval Operations

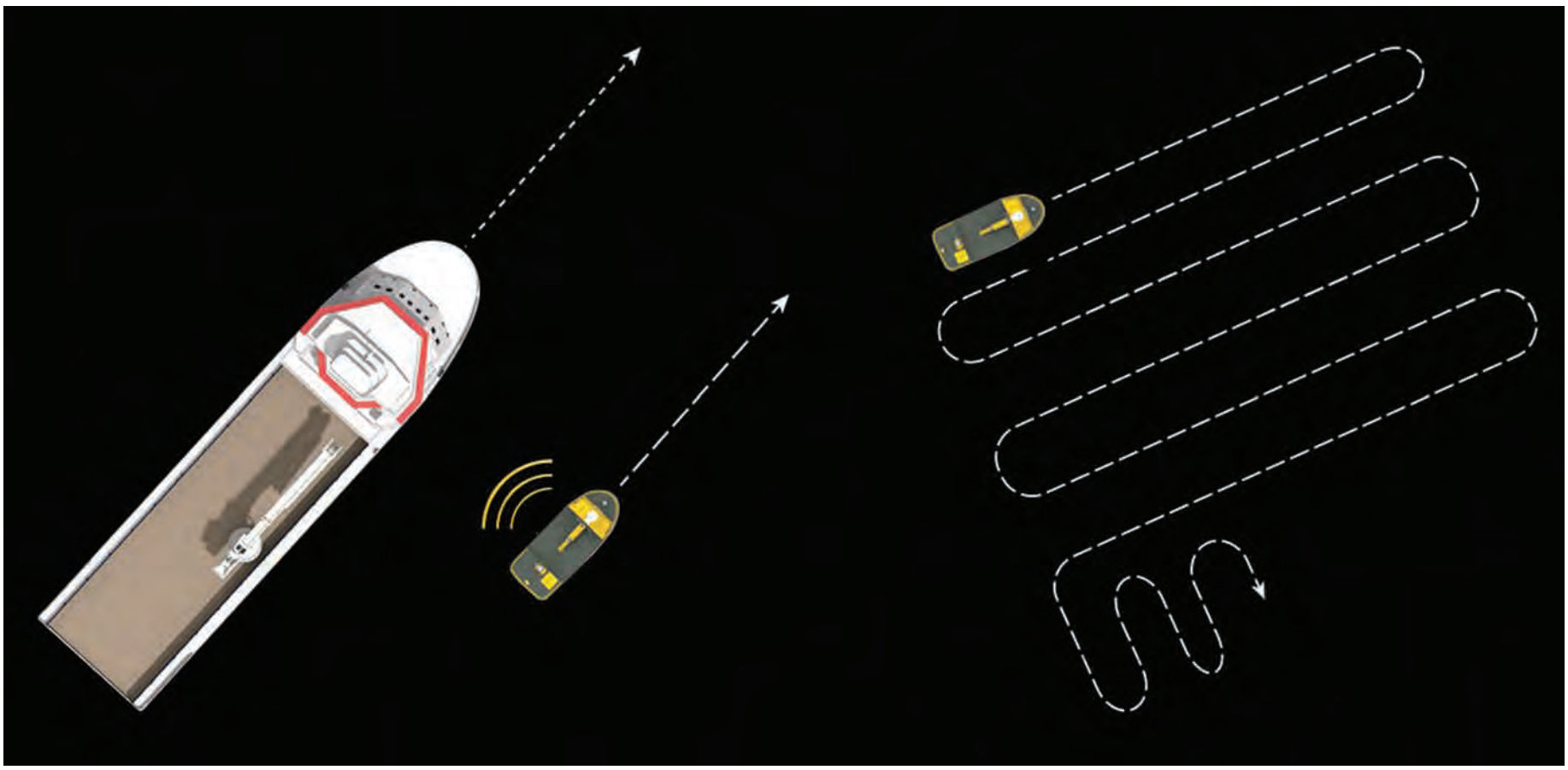
Unmanned technology with the potential to change the face of naval operations within a decade has successfully been demonstrated for the first time by BAE Systems in partnership with ASV at a site near Portsmouth Naval Base. The new system will allow crews to carry out vital tasks such as high speed reconnaissance and remote surveillance while keeping sailors out of harm's way. The technology is designed to be fitted to the RHIBs already used extensively by the Royal Navy. The modified boat is capable of operating autonomously for up to 12 hours at a time, on either a pre-planned route or via remote control. It can reach speeds in excess of 38 knots, providing unique ship-launched manoeuvrability and enhanced situational awareness to support the decision-making of its operators.

Underpinning the system's ability to operate autonomously is its complex array of sensors, including a navigation radar, 360 degree panoramic infrared camera array and laser range finder. Dan Hook, Managing Director of ASV, said, 'The algorithms that we are developing with BAE Systems allow the boat to perform complex missions and navigate through waters avoiding collisions. This gives it the flexibility and sophistication to operate in a number of different tactical roles, whether it's patrolling areas of interest, providing surveillance and reconnaissance ahead of manned missions, or protecting larger ships in the fleet.'

Les Gregory, Product and Training Services Director at BAE Systems, said, 'This technology delivers an extremely robust and fast-moving unmanned boat that is able to perform a number of surveillance and reconnaissance roles, even when operating at high speed or in choppy water. While other programmes are primarily designed for larger, slower

ASV C-Worker 6 is a multi-role work class ASV suitable for a variety of offshore and coastal tasks.

(Credit : ASV)



(Credit : Sea Machines)

Sea Machines USV demonstrating Collaborative Following with Mother Vessel and Planned Survey Tracking by unmanned vessel.

boats to tackle mine counter-measure scenarios, this system provides an extremely manoeuvrable multi-role vessel.'

In 2015 Atlas Elektronik UK were awarded a contract by the UK Ministry of Defence to supply an autonomous minesweeping capability to the Royal Navy. The ARCIMS mission system, based on a specially designed 11 metre (36 feet) vessel, can be operated from shore with the minimum of support or launched and recovered from an RN Hunt Class mine countermeasure vessel. These USVs will create underwater influences to detonate mines in a controlled manner. The system will include autonomous 'Sense & Avoid' capability to enable safe operations at sea. The benefits of these modern unmanned sweeping systems are that they can safely clear sea lanes from mines therefore removing the 'man from the minefield.'

Dull, Dirty and Dangerous Tasks for Workboats

US based company Sea Machines are developing unmanned work boats for a number of applications in the maritime and offshore industries. Sea Machines Autonomous Control Systems (ACS) provide algorithmic supervised autonomous control to enable unmanned operations of a vessel relative to a local base station or mother ship.

The ACS is designed to perform repetitive and quantifiable marine tasks more reliably when compared to direct human control. Michael Gordon Johnson, Sea Machines CEO, likens their new control system to the advances made by Dynamic Positioning (DP), 'A skilled master can keep a vessel in position, but it is much easier for a computer to do it. Sea Machines system is a further advancement beyond DP. The next step is to have unmanned vessels working beyond the line of sight using satellite communications.'

Regarding utilising unmanned vessels for oil spill operations Johnson added, 'The challenge is that you never know where the spill is going to occur. Typically what happens is that boats of convenience and crews of convenience are used, which is not necessarily the most efficient outcome. Working surrounded by crude oil is absolutely miserable, it is also hazardous and can cause health problems.'

Creating vessels and systems that can perform dull, dirty and dangerous tasks has been a driver for many of the vessels that we have seen introduced to date. With autonomous systems highlighted as one of the most significant technologies for the future, this current crop of small unmanned vessels are only the tip of the iceberg for the maritime sector.

The Author

John Haynes is an Associate Fellow of the Nautical Institute, a Yachtmaster Ocean and Advanced Powerboat Instructor. Subject matter expertise includes high speed craft consultancy, product development and specialist training. He is Operations Director of Shock Mitigation www.shockmitigation.com and founder of the RIB & High Speed Craft Directory that brings together specialist boats and equipment for the sub IMO / sub 24 metre professional sector worldwide www.ribandhsc.com

Navy

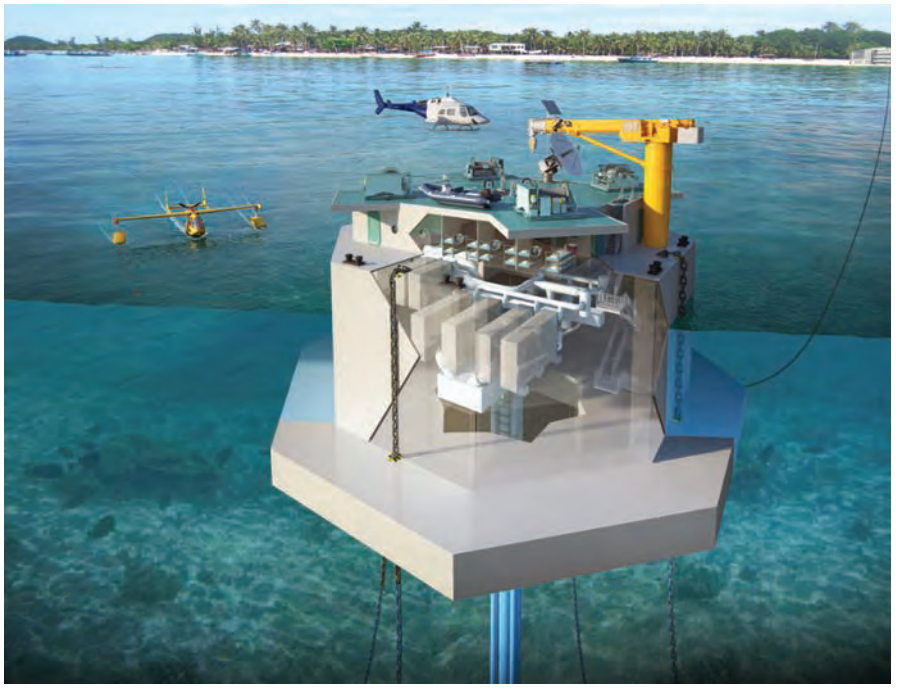
(Photo by Chris Oxley/HII)

Gerald R. Ford Fitted with 14 million Feet of Cable

Shipbuilders at Huntington Ingalls Industries' (HII) Newport News Shipbuilding division have installed more than 14 million feet of electrical and fiber optic cable on the aircraft carrier Gerald R. Ford (CVN 78). The ship's design makes a significant leap to electrical power, with more than 10 million feet of electrical cable and 4 million of fiber optic cable. "Ford's increased electrical capacity makes this ship unique," said Rolf Bartschi, Newport News' vice president of CVN 78 carrier construction. The Gerald R. Ford class's design shifts away from steam power. The transition from steam to electrical power includes the carrier's Electromagnetic Aircraft Launch System (EMALS), which contributes to a 33% increase in sortie generation rate compared to Nimitz-class carriers and steam catapults. The millions of feet of cable make up the carrier's electrical distribution system. The system provides the ship with over 250% more electrical capacity than previous carriers. T

Energy from the Ocean

The Ocean Thermal Energy Converter



Despite historic lows in traditional oil and gas energy markets, research and develoment continues in earnest on a number of projects designed to produce green energy. The latest, an Ocean Thermal Energy Converter (OTEC) from KRISO, received Approval in Principle from classification society Bureau Veritas. KRISO (Korea Research Institute of Ships & Ocean engineering), established in 1973, is a government-funded research institute in the Republic of Korea. The BV approval applies to the 1MW plant, which will be built for installation off the coast of South Tarawa, Republic of Kiribati, in the South Pacific Ocean.

"OTEC technology offers the potential for round-the-clock clean renewable energy from the ocean," said Matthieu de Tugny, SVP and Head of Offshore, Bureau Veritas. "We are excited to deploy our expertise in offshore energy, met-ocean studies and structures to help bring this project which will deliver clean electricity to remote areas to fruition."

Ocean Thermal Energy Conversion (OTEC) is a sustainable way to produce electricity from the difference of temperature between deep cold and warm surface seawater. A working fluid is successively vaporized and condensed in a thermodynamic cycle, with the gas phase driving a turbo-alternator producing electricity.

KRISO's 1MW OTEC plant is the first practical level of plant on a pathway to building a 100MW commercial system. It consists of an octagonal 6,700 tonne four deck floating platform 35 m across moored 6 km offshore in a water depth of 1,300 m. A 1,000 m pipe 1.2 m in diameter will be used to pump cool water up from the depths to be fed to process plant on the platform.

Approval in Principle for Bureau Veritas implies that the design is feasible, achievable, and contains no technological show-stoppers that may prevent the design from being matured and that the design is deemed to be suitable for use in the metocean conditions that the unit facility will be located in.

(Photo: Arianespace

First Intelsat EpicNG Satellite Launched

Intelsat 29e, the first of the Intelsat EpicNG high throughput satellites, was launched from French Guiana aboard an Ariane 5 vehicle. Manufactured by Boeing and equipped with advanced digital payload, Intelsat 29e will bring high throughput capacity in both C- and Ku-band to North and Latin America and the North Atlantic region. Intelsat 29e will be placed into service at 310° East, where it replaces Intelsat 1R.

Intelsat 29e is the first satellite of Intelsat's next generation, all digital EpicNG satellite platform, which combines wide beams and spot beams with frequency reuse technology and the sector's most advanced digital payload. The digital payload will provide customers with unprecedented security and flexibility, enabling customers to seamlessly access and shift capacity to match their usage needs in a particular region or timeframe.

Intelsat EpicNG is optimized to provide satellite connectivity for applications including the Internet of Things, enterprise, wireless infrastructure, aeronautical and maritime mobility, and government, which are expected to provide a combined $3 billion incremental opportunity by the year 2020.

Intelsat EpicNG is backwards compatible and fully interoperable with Intelsat's existing satellite fleet and terrestrial infrastructure, allowing customers to use currently deployed network hardware to access the high performance connectivity. The platform's open architecture allows customers to have control over service offerings and hardware selection, providing differentiation of service offerings.

The payload will deliver carrier-grade services to fixed and mobile network operators, and broadband for applications such as enterprise, aeronautical and maritime mobility, and government throughout the Americas.

In addition, the satellite also features spot beams for mobility customers serving the heavily trafficked North Atlantic region. Companies such as Harris CapRock, Panasonic, EMC (formerly MTN), Axesat and leading national telecom operators in Latin America will be among the first to deploy services on the platform.

Thordon Takes the Test in Alaskan Waters

As environmental regulation regarding emissions into the water continue to tighten, solutions such as water-lubricated bearings are gaining steam as a means to ensure clean operations. A leading supplier in this field has been Thordon, and after nine years of operation in the harsh, abrasive waters of Alaska's Yukon River aboard Inland Barge Service's push boat Ramona, Thordon Bearings' RiverTough water-lubricated tail-shaft bearing system has emerged free of wear and tear, the company reports. The performance of the RiverTough bearings in waters renowned for their high content of gritty glacial silt came to light when the 52.5 ft. workboat's cracked struts underwent repair in dry-dock.

"In the spring of 2011 we were doing some hot work on one of the struts and decided to change the bearing since everything was apart," said Charles Hnilicka, owner of Inland Barge Service Inc. "We didn't have to and could have reinstalled the original bearing after the hot work, but we had a spare set. When we took it out, the RiverTough bearing and sleeves had no appreciable wear and tear, which was amazing considering the environment in which the Ramona operates."

The 1971-built push boat delivers freight and consumer goods to communities along the Yukon River and its tributaries. These shallow waters, usually only navigable between May and October, are fed by rain and glacial melt containing highly abrasive silt and ground rocks, called glacial till, that can severely damage other propeller shaft systems.

Since 2003, when Inland Barges Services replaced the single-screw Ramona's bearings, Thordon's polymer system has undertaken more than 2000 hours of operation per year in some very abrasive environments.

"I haven't seen anything like it," said Hnilicka. "When we used rubber bearings we were lucky to get a full operational season out of them before they needed replacing."

(Courtesy of Inland Barge Service Inc)

Above: Inland Barge Services' push boat Ramona serves the communities along Alaska's Yukon River. Inset: Thordon Bearings' RiverTough routinely outperforms rubber bearings, even in highly abrasive waters.

"We have data from workboats operating on the Mississippi showing typical RiverTough wear rates of 0.075mm to 0.100mm (0.003" to 0.004") in 6000 to 7000 hours of annual use, but this is the first time we have received data from a vessel operating in the high north," said Scott Groves, Thordon Bearings' Business Development Manager.

North P&I Club Warns on Downsides of "Big Data"

North P&I Club warns that despite the enormous benefits of digital technology on and around ships, there are downsides. While Cyber threats head the list, less obvious risks include video calls, emails, mobile devices and even 3D printing. "While many ships now offer technology such as satellite video calling to keep crews in touch with loved ones back home, care should be taken to ensure this does not make matters worse," said Tony Baker, Loss Prevention Director. "For some seafarers, having easy access to friends, family and their ongoing domestic problems could lead to increased anxiety." Baker said digital technology may also be compounding the isolation problems at sea by reducing social interaction on board. "Rather than chat, play games or even watch videos with other crew members, it is now all too easy to for seafarers to retreat to their cabins with their mobile devices.

It is in the general interests of the ship operator, vessel and crew to ensure a decent level of social interaction on board. Occasionally getting out the dart board, playing cards or board games will forge relationships and help the crew to be happy. A happy crew works more effectively, more efficiently."

In a separate development, North warns shipowners to be aware of potential criminal use of 3D scanners and printers. These are apparently now being used to clone and replace the security seals on shipping containers after break-ins. "The seals can be made within 10 minutes and include all the relevant identification marks, so thefts may remain undetected until containers reach their final destinations," said Colin Gillespie, Deputy Loss Prevention Director.

"The digital age has brought extraordinary benefits to the shipping industry and to crews," said Gillespie. "However, it is important for shipowners and seafarers not to let digital technology completely replace vital shipboard activities such as social interaction, teambuilding and a hands-on, common-sense approach to safety and security."

Vietnam Grows its Fishing Fleet

In keeping with its reputation as a nation that can overcome all obstacles, Vietnam is rebuilding its aging fishing fleet. With a government program of soft loans, fishermen are building boats along 28 coastal provinces from the north to the south of Vietnam. **Capt. Trinh Van Hung**, grew up in a fishing family and, after completing his schooling, he fished briefly with his father. His curiosity took him into business as a trader but the call of the sea was strong. At 25, he returned to the fishing. After taking some navigational courses in a marine institute, he went right to work as a captain of his own boat. That was some years ago and the fishery has been good to him. He currently owns a pair of 23 x 5.5-m boats.Huang was accepted to the government program to increase the fleet. Keeping it in the family, he approached his brother-in-law, Nguyen Van Tuyen, who owns the Tuyen Phong Shipyard in the village of Hòalôc, of Hâulôc Thanhôa Province. The yard is noted for the quality of its larger wooden boats. Capt. Hung obtained a design for a 26 x 6.2-m wooden vessel with a 3.1-m molded depth. It is larger than his existing boats and will be well suited for his drift-net tuna fishery. A typical trip for tuna will take him 150 miles south to Central Vietnam where he fishes offshore with a crew of 12. The gear is a multiple segment gillnet 60-m deep x 70-m long per segment. Tuna range from 3 to 25 kilos. They are not bled onboard but are individually wrapped in plastic and iced in insulated totes. Trips are limited to four or five days at sea. While fishing is permitted year round, the catches are best from the First Lunar Month to the Seventh Lunar Month.

In Southeast Asia, converted, second-hand generator engines power many fishing boats. In order to qualify for the loan program, the new boat is required to have a new, purpose-built marine engine. Cummins NTA855 engines, from which he has had good service, power Capt. Hung's other two boats. For his new boat he opted for a U.S.-made Cummins KTA19 M4. With a 700 hp rating to qualify for a government fuel subsidy, this will give the new boat ample power and will generally be operated at a lower rpm than the specified 2100. The main engine will turn a 1.9-m propeller through a Hangzhou Advance gearbox with 6:1 reduction. A power takeoff on the main engine will provide power to a hydraulic net puller. A small 10 kW genset will meet the vessel's electric requirements.

The tradition of wooden boat building is strong in Vietnam although quality wood is becoming harder to obtain. For both framing and planks, the shipyard imports round logs from Lao and saws them on their own mill.

As it is the world over, launch day deserves some ceremony and the village of Hòa Lôc does it well. Performers sang in front of a large poster celebrating the shipyard and the building program. Mr. Nguyen Duc Cuong, a representative of the Fishery Department under the Dept. of Agriculture and Rural Development of Thanhhoa Province, explained that the province had an allocation of 65 new boats, of which 16 had been approved and six had already been completed. **With security of the fishing fleets a concern, he said the government was developing a new communications system to link all the boats.**

When the singing and speeches were done, Capt. Hung gave the signal. Rockets launched showers of confetti, the flags mounted around the gunwales of the boat snapped smartly in the breeze and the carriage began its slow descent. A boat launch is always a fine thing, but the launch of a big wooden boat in this day and age is truly spectacular. The pragmatically named TH9388TS floated evenly with space to her waterline.

Nearby the launching slip, a sister-ship was fully framed with massive timbers bolted and solid.

A new Cummins engine was on the way and, in a few months, the Tuyenphong Shipyard would be celebrating another launch.

(All Photos: Haig-Brown photos courtesy of Cummins Marine)

Clockwise starting left :

Owner Capt. Trinh Van Hung is proud of his new boat.

All finished the well-shaped transom stern should work well in a following sea.

Cummins Vietnam Engine Sales Engineer Linh Cam Nguyen inspects the KTA19 main engine.

A new 26-m boat is framed up and ready for planking.

To view an extensive photo montage of this unique vessel and its launch ceremony, please visit: www.marinelink.com/news/fishing-vietnam-fleet403343.aspx

MARITIME REPORTER AND ENGINEERING NEWS

EDITORIAL CALENDAR

		BONUS DISTRIBUTION
JANUARY Ad Close: Dec. 21	**Ship Repair & Conversion Edition** Market: Passenger Vessel Operation Optimization Technical: Marine Salvage & Recovery Product: Maritime Propulsion: Gears, Thrusters, Waterjets & Propellers Country Reports: Spain & Portugal	**PVA Maritrends** Jan. 22-26 Washington DC
FEBRUARY Ad Close: Jan. 21	**Cruise Ship Technology Edition** Market: U.S. Navy Technology Technical: BIG DATA: Satellite, Data, Tracking & Communications Product: Marine Coatings & Corrosion Control Country Report: Italy	**Cruise Shipping Miami** March 14-17, Miami, FL **Asia Pacific Maritime** March 16-18, Singapore **ASNE DAY** March 2-3, Arlington, VA **NACE Corrosion** March 6-10. Vancouver **PSOCE 2016 Florida** March 17-19, Tampa, FL
MARCH Ad Close: Feb. 22	**Green Marine Technology** Market: Training & Education: Maritime Simulation Centers & Technology Technical: Workboat Fleet Maintenance & Repair Product: Green Marine Fuels & Lubricants and Emission Technologies Country Report: Japan	**CMA Shipping** Mar 21 -23 Stamford, CT **Workboat Maintenance** April 12-14, New Orleans, LA **Sea Japan** April 13-15, Tokyo
APRIL Ad Close: Mar. 21	**The Offshore Annual** Market: Port & Ship: Loading and Unloading Technology & Equipment Technical: Satellite Communication Product: Deck Machinery, Winches and Ropes Region Reports: Scandinavia: Denmark, Finland, Norway & Sweden	**OTC** May 2-5, Houston, TX **Inland Marine Expo** May 10-12, St. Louis **Portsecure 2016** May 18-20, Toronto
MAY Ad Close: Apr. 21	**The Marine Propulsion Edition** Market: RIB & Patrol Boat Report Technical: Workboat Design & Construction Product: Marine Electronics: Navigation Radar & ECDIS Country Reports: Greece & Turkey Special Report: U.S. Coast Guard Annual	**Posidonia** June 6-10, Athens **Sea-Air-Space** May 16-18, National Harbor, MD **SeaWork** June14-16 Southampton, UK **CIMAC CONGRESS** June 6-10. Helsinki
JUNE Ad Close: May. 20	**Annual World Yearbook** Market: Maritime Simulation & Training Centers Technical: Dredging Vessel Technology Product: Pumps, Valves, Pipes & Insulation Country Reports: U.K. & Ireland	**Marine Money Week** June 21-23, New York, NY
JULY Ad Close: Jun. 21	**Marine Communications Edition** Market: Tugboat, Towboat & Barge Technical: Oil Spill Response & Recovery Product: Marine Electronics Equipment & Supplier Guide Country Report: Singapore	JULY SPECIAL CONTENT ELECTRONIC EDITION www.whitepapers.marinelink.com
AUGUST Ad Close: Jul. 21	**The Shipyard Edition** Market: Offshore Deepwater: Structures and Systems Technical: Heavy Lifting Solutions: Maritime Cranes, Winches, Windlasses & Capstan Product: Ballast Water Technologies Country Report: The German Maritime Cluster	**SMM HAMBURG** September 6-9, Hamburg, Germany
SEPTEMBER Ad Close: Aug. 22	**Maritime & Ship Security** Market: Caring for the Mariner: Onboard Amenities Technical: Maritime Propulsion: The Hybrid Drive Solution Product: Clean Water Technologies Region Report: U.S. West Coast Maritime	**Shipping Insight** October, Stamford, CT
OCTOBER Ad Close: Sep. 21	**Marine Design Annual** Market: Ship Classification Societies Technical: Marine Firefighting, Safety & Salvage Product: CAD/CAM Country Report: The Netherlands	**SNAME** November 2-4, Bellevue, WA **Arctic Technology Conference** October 24-26, St. John's
NOVEMBER Ad Close: Oct. 21	**Workboat Edition** Market: The 'LNG-as-Fuel' Revolution Technical: Deck Machinery, Winches & Ropes Product: Marine Coatings Special Report: Gulf of Mexico Builder and Supplier Guidebook	NOV. SPECIAL CONTENT ELECTRONIC EDITION www.whitepapers.marinelink.com **Workboat Show** Nov. 30-Dec. 2, New Orleans, LA
DECEMBER Ad Close: Nov. 23	**Great Ships of 2016** Market Report: The Autonomous Ship: Command & Control Technical: Shipyard Automation: Welding & Cutting Equipment Product: Marine Engine Guide Country Reports: China & Korea	**Surface Navy Association 2017** Crystal City, VA

Sølvtrans Live Fish Carrier

Kleven signed a contract with Sølvtrans, one of the world's largest transporter of live fish, for the delivery of a live fish carrier vessel. It will be delivered from Myklebust Verft in Q3 2017. This is the second order from Sølvtrans on the NVC 387 design from Rolls-Royce. The 80 m long vessels will have a load capacity of 3200 cu. m. each, and its three tanks can take in up to approximately 500 tons of live fish in total.

34m Cat Ferries Being Built for Auckland

Incat Crowther reports that construction has commenced at Q-West in Wanganui, New Zealand, on a pair of additional 34m catamaran passenger ferries for Fullers Group Ltd. The new boats will be sister ships to Te Kotuku which was also built at Q-West and delivered in 2014. The vessels will carry 401 passengers and include the addition of a sun deck.

The main deck features seats for 174, a large café, luggage racks and wide access doors. Also fitted will be two toilets (one of which is handicap-accessible) and racks for 14 bicycles.

The upper deck features 76 exterior seats and 81 interior seats. An additional bar and pair of toilets are also located on the upper deck.

The wheelhouse retains its successful asymmetric configuration, designed in consideration of the operational requirements. The frequently used starboard wing control station is enclosed for protection from the elements, while the port side is dedicated to crew access via stairs to the foredeck, which houses palletised cargo and a deck crane.

While largely the same, one key difference in the new vessels are larger engines, carrying the increased deadweight and offering improved performance and efficiency. The vessels feature conventional fixed pitch propellers and offer an efficient loaded service speed of 26 knots.

The vessel will be fitted with a dry exhaust system which, along with the engine room air outlets, will exit high above the upper deck. This configuration, which reduces fumes and noise in passenger areas, is typical of vessels in the Fullers fleet.

Main Particulars

Length o.a.	111.6 ft. (34m)
Length w.l.	110.9 ft. (33.8m)
Beam o.a.	31.25 ft. (9.5m)
Draft (hull)	4 ft. (1.2m)
Draft (prop)	5.9 ft. / 1.8m
Depth	10' / 3.05m
Construction	Marine grade aluminium
Fuel Oil	2113 gallons
Fresh Water	793 gallons
Sullage	793 gallons
Passengers	401
Crew	5
Speed (Service)	26 knots
Speed (Max)	30 knots
Main Engines	2 x Cummins QSK50-M
Power	2 x 1342kW (1800hp) @ 1975rpm
Propulsion	2 x Fixed-pitch propellers
Generators	2 x 100 kVA Cummins 6B-CP
Flag	New Zealand
Class / Survey	Maritime New Zealand

Dual-fuel Bulkers Built to New DNV GL Rules

ESL Shipping's new dual-fuelled bulk carriers will not only be the first large LNG-fuelled bulkers, but the first vessels constructed to the new DNV GL rule set. Due for delivery in early 2018, the two 25,600 dwt vessels are optimized for trading in the Baltic Sea region.

Featuring the Deltamarin B. Delta 26LNG design, the two ships will feature dual-fuel main and auxiliary machinery, resulting in CO2 emissions per ton of cargo transported half that of present vessels. The bulk carriers will be built to the new DNV GL rules for general dry cargo ships with DNV GL ice class 1A and will have type C LNG tanks of approximately 400 cu. m. capacity.

Knut Ørbeck-Nilssen, CEO of DNV GL – Maritime (left) with Mikki Koskinen, MD of ESL Shipping Ltd.

(Photo: DNV GL)

McAllister Taps Horizon to Build New Tractor Tugs

McAllister Towing continues its long, 150-plus year hisory of serving the maritime industry announcing investment in new boats sporting the latest technology.

McAllister Towing said that Horizon Shipbuilding, Inc. of Bayou La Batre, AL, will build 100 x 40-ft. Escort/Rescue tugs for the company, vessels powered by 3516E Tier IV Caterpillar engines with Schottel SRP4000FP units producing 6,770 hp and 80 metric tons bollard pull. The tugs will be classified with ABS. The hull has been designed by Jensen Maritime for enhanced ship docking abilities in addition to direct and indirect escorting. The tug has been designed and simulator tested to assist new Post-Panamax and Ultra-Large Vessels. Towing machinery will include a Markey asymmetric render-recover winch on the bow and a Markey tow winch with a spool capacity of 2,500 ft. of 2.25" wire on the stern.

"By using our GORDHEAD management software I am confident we will be able to efficiently produce these state-of-the art tugs on schedule and within budget," said Travis Short, president, Horizon Shipbuilding. Upon delivery in early 2017, McAllister plans to name the first tug the CAPT. Brian A. McAllister after the company's Chairman. The second tug will be named the Rosemary McAllister, after his wife. The tugs will be the 31st and 32nd tractors and the first Tier IV tugs in McAllister's fleet.

Above: Captain Brian A. McAllister, Chairman McAllister Towing and Travis Short, President Horizon Shipbuilding at the 2015 International Workboat Show.

Below: A rendering of the Brian A. McAllister from Jensen Maritime

FURUNO: Two New Radars

FAR-15x3

FAR-15x8

FURUNO announced that two new radar models, the FAR-15x3 series and FAR-15x8 series, will be ready for launch very shortly. The FAR-15x8 series fully meets the latest performance standard of IMO for all Cat.2 radar (19-in. display is required for radar effective diameter of 250 mm) and Cat.3 radar (15-in. display is required for radar effective diameter of 180 mm). The FAR-15x3 series is non-IMO Radar suitable for workboats and fishing vessels, but its performance and function still match those of FAR-15x8 series Radar.

Features of the FAR-15x3 and FAR-15x8

1. Target Analyzer (the FAR-15x3 series)
FAR-15x3 series have a new "Target Analyzer" function that displays moving targets, stationary targets, rain, sea surface and targets closing in on your vessel in different colors, helping to improve situational awareness.

2. Automatic Clutter Elimination (ACE)
ACE delivers decluttered echo presentation with a single press of a dedicated key. When ACE is in action, gain control, sea surface clutter and rain clutter control are adjusted automatically. ACE is based on FURUNO's unique signal processing technology.

3. Fast Target Tracking
In target tracking, the acquisition speed has been improved as a speed and course vector is displayed in a matter of seconds after selecting any target.

4. Enhanced usability on the Control Unit
A touchpad is employed on the standard control unit, offering durability and intuitive operation. The trackball control unit is also connectable as an option to support single hand operation.

5. A variety of display modes (FAR-15x3 series)
User can select display mode according to the need of the operators, including full screen Radar echo presentation, for example.

www.furuno.com

Testing for Damaging Shaft Voltages

The new AEGIS Shaft Voltage Tester Digital Oscilloscope makes it easier than ever to check in-service motors for damaging VFD-induced shaft voltages and head off bearing damage and costly unplanned equipment downtime. The AEGIS Shaft Voltage Tester Digital Oscilloscope is designed to take and capture highly accurate voltage measurements from the spinning shafts of motors. The 2-channel, full-function 100 MHz oscilloscope has a 5.7-in. TFT LCD color display, a multi-language user interface, and a 5-hour rechargeable/replaceable lithium-ion battery pack. The oscilloscope is capable of sampling rates of 1 GSa/s to 50 GSa/s and has a USB port for data transfer or flash drive storage. The handy AEGIS One-Touch screen capture feature dramatically simplifies data collection for reporting and analysis. Screen images can be saved to a USB simply by pushing and holding the "Save" button for 6 seconds.

AEGIS Shaft Voltage Tester Digital Oscilloscopes are offered in several packages. Accessories include a 9V/4A power adapter, 1X/10X oscilloscope probes, test leads for the multimeter, a probe calibration tool, a rechargeable/replaceable 5-hour battery and a USB flash drive with user manual.

E: sales@est-aegis.com
W: www.est-aegis.com

Trio of Orders for ICCP Systems on FPSOs

Cathelco won orders to supply hull corrosion protection systems for three FPSOs. Two of the systems are being supplied to MODEC, while the third will be installed by Sembcorp Marine's Jurong yard in Singapore.

The FPSO Cidade de Campos dos Goyatacazes is being built by MODEC for deployment off Brazil by Petronas. It will be capable of processing 150,000 barrels of crude oil per day, 176 million cu. ft. of gas, and have a storage capacity of 1.6 million barrels. Due for delivery in late 2017, it will be positioned in the Campos Basin, 125 km from Macae. Cathelco will supply an impressed current cathodic protection (ICCP) system which will safeguard the hull over an operational life of 20 years. The FPSO will be installed with 1,000 amp forward system and a 1,200 amp aft ICCP system, each consisting of six hull mounted disc anodes and two reference electrodes.

Photo: Cathelco

Engineer checking Cathelco ICCP control panel.

The vessel will also be installed with the latest Quantum control panels which provide comprehensive data about the performance of the system. A further advantage is the whole system can be monitored from the aft control panel. This simplifies monitoring for the crew and enables data to be downloaded to a USB stick and sent to Cathelco for analysis.

Cathelco are supplying another ICCP system for the FPSO Catcher which is being built by the IHI Corporation's yard at Aichi, Japan under the supervision of MODEC who are working on behalf of BW Offshore. After the integration of the topside modules and completion in Singapore, the FPSO will be deployed in Premier Oil's Catcher field in the North Sea.

FPSO Catcher will be installed with forward and aft ICCP systems, each 400 amps and consisting of two hull mounted disc anodes and two reference electrodes. The anodes and reference electrodes are designed to be diver changeable, enabling them to be replaced at sea, if necessary, without the need for drydocking.

A third order has come from Sembcorp Marine's Jurong yard in Singapore where a shuttle tanker is to be converted into FPSO Libra. Scheduled for completion in 2016, the FPSO will have the capacity to produce 50,000 barrels of oil and 4 million cubic meters of natural gas, per day. It is expected to be chartered by Petrobras for use in the Libra field in Brazil's Santos Basin.

Cathelco will provide a 400 amp forward and a 600 amp aft ICCP system for the FPSO Libra, the former consisting of two anodes and two reference electrodes, while the more powerful aft system will have four anodes and two reference electrodes.

www.cathelco.com

Propulsion

Azipod Propulsion

Destined for installation on board one of the highest profile cruise ship deliveries scheduled for 2016, the latest Azipod XO podded propulsion recently departed from the ABB factory in Helsinki.

The unit, which commands 20.5 MW of power, has been transfered from ABB's Vuosaari Harbour plant to the dockside for loading, bound for Meyer Werft, Papenburg. It will be installed on one of two newbuildings due for delivery from the German yard in fall 2016.

ABB is delivering the complete electrical power plant and propulsion systems for the two new cruise ships. The 335-meter length vessels will be able to accommodate 3,300 passengers each and will be delivered one apiece in fall 2016 and 2017.

Each Azipod propulsion unit takes about two months for technicians to assemble at the Vuosaari plant. Across town at ABB's Helsinki motors, generators and drives factory, the powerful synchronous motors at the system's core take shape over six months.

ABB has delivered, or has on order, Azipod propulsion units to about 200 vessels including merchant, offshore and specialized ships. Through a continuous commitment to product development and innovation, today up to two thirds of the most modern larger cruise ships, ice breakers and highest ice-class cargo vessels feature Azipod propulsion from ABB.

www.abb.com

(Photos: ABB)

SENER Debuts LNG Bunker Vessel Design

Relying on more than four decades of experience and activities in the maritime and energy markets, including the design of a Floating Regasification and Storage Units (FSRU), SENER technology and engineering group has developed its own design of a Liquefied Natural Gas (LNG) bunkering vessel.

The SENER design follows the tendencies for 2030 required by operators and ship-owners. The result is a Ship To Ship (STS) LNG bunkering vessel, with IMO type C LNG cargo tanks at 4.5 bar and -163ºC, which reduces to a minimum the steam generated in the tanks (BOG - Boil Off Generated). A BOG management system has been incorporated, to process the BOG generated in the transfer process. This storage system allows greater flexibility of operation, reducing the effect of the wave inside the tank, sloshing, thus allowing partial loads.

The vessel is designed for navigation, maneuverability and operation in adverse meteorological conditions, including Unrestricted Navigation notation. The propulsion uses LNG as fuel, with type C tanks on deck. Likewise, it includes last generation articulated arms designed for the STS bunkering process, with a high level of automation and control, including innovating measuring system to obtain the maximum accuracy in the measurement of the transference rate, and complying with the regulations of SIGTTO, OCIMF and IGC, among others.

Main Particulars

Length, o.a.	114.8m
Molded breadth	20.4m
Molded depth	8.5m
Draft	5.7m
Speed	15 knots
MCR	6000 kW
Capacity	8000 cu. m.
Number of tanks	2
Material tanks	9% Ni Steel

CASCADe: New Ship Bridge Designs

CASCADe, a three-year, EU-funded project which recently came to a close, developed new methodologies in which information is shared and displayed on a ship's bridge, helping to improve efficiency on board and contribute towards the prevention of accidents at sea. It developed a new adaptive bridge design methodology that treats both human agents and electronic equipment as parts of a cooperative system, optimizing the sharing of information.

In addition, CASCADe has developed a set of adaptive bridge displays. A touch screen 'Shared Display' is intended to aid communication and cooperation on the bridge. This tool is fully customizable and allows one screen to show multiple sources of information in whatever configuration is most suitable for a particular situation.

Moreover, the CASCADe console was integrated with tools used by pilots in their Portable Pilot Units (PPUs). Firstly, CASCADe developed a protocol to share pilotage routes between the PPU and the ship's electronic charts. Secondly, a link was established between the PPU and the bridge screens to allow mirroring of information from the PPU screen, enabling crew members to see extra information normally only available to the pilot.

All of these CASCADe tools were tested on both a physical simulator and a virtual simulator. The virtual simulation platform makes it possible to test new bridge designs at the earliest stages of development, based purely on computational models.

Under the coordination of OFFIS, CASCADe included a consortium of seven project partners from five EU countries including BMT Group Ltd, Raytheon Anschuetz GmbH, Mastermind Shipmanagement Ltd, the University of Cardiff, Marimatech AS and Symbio Concepts & Products SPRL.

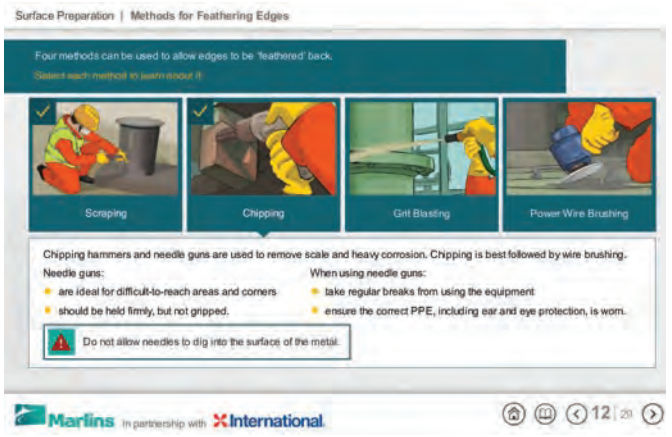
www.cascadeproject.eu

Onboard Marine Coating e-Learning Course

AkzoNobel's Marine Coatings business and Marlins have launched a global training solution to support the effective onboard application and maintenance of the International range of marine coatings. "Painting and Surfaces" combines the experience of AkzoNobel's marine coatings business and its International bramd with Marlins' capabilities in training development and delivery, creating an e-learning program that supports the long-term maintenance and performance of coatings.

"Painting and Surfaces" is designed to be undertaken by any seafarer with responsibility for marine coatings. Highly visual and engaging imagery is used throughout the course to maximize user understanding of the subject matter.

"There are significant benefits of undertaking effective onboard marine coatings maintenance, both in terms of reducing long-term operational costs and improving a vessel's overall maintenance and operation standards," said Robert Wong, Marketing Director of AkzoNobel's Marine Coatings business. "Painting and Surfaces deconstructs the complexities of coating application, and educates a ship's crew in an easy-to-understand and approachable manner."



"Painting and Surfaces" will be included in the next update to the Marlins eLearning Suite for Seafarers. The course can also be purchased by individuals via the Marlins online shop, as well as being available to clients of AkzoNobel marine coatings brand International as part of their package or as an optional add-on.

www.international-marine.com/seastores

PPG PHENGUARD PRO

PPG Protective and Marine Coatings unveiled PHENGUARD PRO, a tank coating system that is designed to provide benefits to shipyards and shipowners. For shipyards and at installation, the coating system provides potential efficiency gains of more than 20% compared to traditional three-layer coating systems, according to PPG. For owners the manufacturer claims it provides the widest chemical resistance and the longest carriage time on the market of more than 3,400 cargoes, delivering maximum flexibility to the product tanker trades.

PHENGUARD PRO has been specifically designed for use on IMO II and III chemical/product tankers typically in the 30,000–60,000 dwt range.

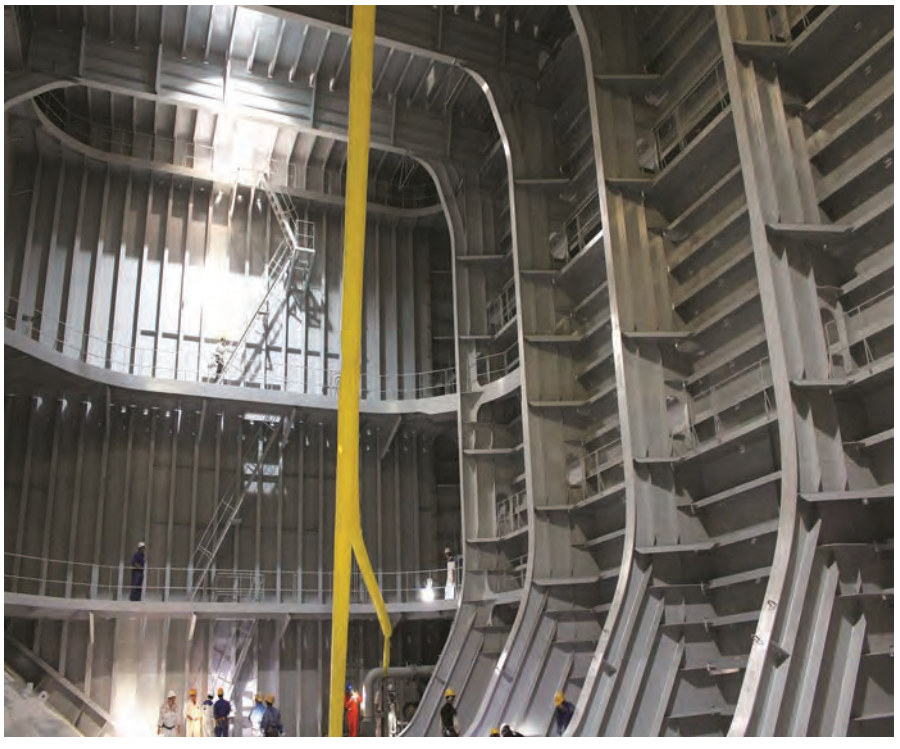
"PHENGUARD PRO is truly a game changer for the product tanker market offering shared benefits to both the shipyard and owner/operator by combining over 20% efficiency gains on application at newbuild and/or maintenance with trusted and proven performance for the owner," said Sijmen Visser, PPG's Global Marketing Manager Marine.

PHENGUARD PRO has been developed from the PHENGUARD phenolic epoxy product technology.

PPG identified market demand in the IMO II/III product/chemical tanker segment for a two-layer phenolic epoxy system that offers maximum cargo flexibility with improved efficiency at installation. The result is PHENGUARD PRO, engineered and launched for both newbuilding and refurbishment projects.

"The coating system can be applied in temperatures down to 5°C making it an 'all year round' solution that reduces the costs of heating for winter application," said Visser.

Finally, PHENGUARD PRO is designed to provide a very smooth finish that is easy to clean, saving time and labor at cargo switching and tank cleaning. Ship owners will also benefit from well-documented guidance and procedures for cargoes requiring pre-wash, thus extending the coating life.



PHENGUARD PRO is a tank coating system that is designed to provide benefits to shipyards and shipowners.

Hempel

Hempasil X3+

Building on its Hempasil range of fouling release systems, Hempel launched a new antifouling to deliver optimal fuel savings and return on investment. Hempasil X3+ is a top of the line, biocide free, two-component, fouling release coating with a high solids content that ensures clean hulls for longer periods. It is designed to create a smooth, low energy surface with unique fouling release properties. Its hydrogel micro layer prevents fouling organisms from firmly adhering to the hull while retaining the self-cleaning properties of silicone. The product is a completely biocide free paint and has no impact on the marine environment.

Hempasil X3+ is based on a unique hydrogel technology comprising a network of advanced polymer chains which absorb high amounts of water (to a level of more than 99%), to create a water-like boundary layer. This layer effectively tricks the fouling organisms into believing the hull is a liquid and not a solid surface and this minimizes protein and bacterial adhesion.

New Tank Coating, too

Hempel also launched a new pure epoxy tank coating, Hempadur 15460, to replace its Hempadur 15400 tank coating. Hempadur 15460 is designed specifically as a tank coating for chemical vessels and is based on amine adduct cured epoxy technology, which the manufacturer says delivers resistance to continuous immersion in a range of chemicals, including crude oil up to temperatures of 80ºC/176ºF. The coating uses no toxic products and can be used to coat all liquid cargo tanks. It is also suitable for grey and black water tanks, mud and brine tanks, refrigerated seawater fish tanks and other vessel tanks.

According to Hempel, the benefits of Hempadur 15460 include higher volume solids with reduced solvent emissions; low cargo absorption and retention meaning quicker cargo turnaround and greater flexibility; and application in a two coat system to reduce application times.

www.hempel.com

International Paint
Jim Brown


Carnival Corp
Chen


Hendry Marine
Long


Bouchard Transportation Company
Bouchard


AWO
Carpenter


LR
Boardley


LR
Nick Brown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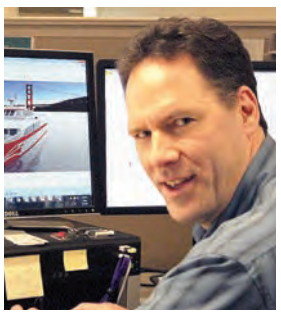
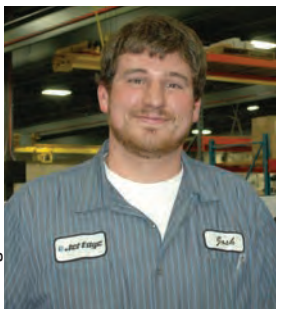

EBDG
Ayers


Webb
Scott


ASRY
Maher


Jet Edge
Bauer

Brown Announces Retirement

Jim Brown, a ubiquitous figure in the global maritime coatings world for decades as the Market Development Manager of AkzoNobel's Marine Coating's brand, International, announced he is retiring effective the end of January 2016.

Carnival Appoints Chen in China

Carnival Corporation & plc said that Roger Chen has been appointed chairman in China, effective January 1, 2016.

Long Named CEO

Hendry Marine Industries Gulf Marine Repair Corporation, one of the Southeast's leading tug-barge shipyards, announced the hiring of Jim Long as the new Chief Executive Officer.

SUNY Maritime Honors Bouchard

The State University of New York Maritime College conferred the honorary degree of doctor of science degree on Morton S. Bouchard III, the president and CEO of Bouchard Transportation Company, Inc., during winter 2016 commencement exercises, January 29.

AWO Promotes Carpenter to COO

The American Waterways Operators (AWO) said that EVP Jennifer Carpenter has been promoted to the position of Chief Operating Officer, effective January 1, 2016.

Boardley, Brown Promoted at LR

Lloyd's Register announced two significant organization changes: Tom Boardley steps up to a new role as Executive VP and Global Head of Corporate & External Affairs and Nick Brown is promoted to Marine Director.

NAVTOR Expands in Singapore

NAVTOR is continuing to build its business footprint beyond Europe, with the news that the Norwegian firm is expanding its new Singapore office. The base, which opened in December 2014, has given the firm an important foothold in the Southeast Asian market, driving new business with shipowners and managers such as NEOM, SeaTeam, Waruna Shipping, Samudera Shipping, and Sattech International. Lawrence joins as Area Sales Manager .

XL Catlin Promotes Elder

XL Catlin promoted Anne Marie Elder to the role of Chief Underwriting Officer Marine for the Americas region.

EBDG Hires Ayers

Will Ayers has accepted a position as Chief Electrical Engineer with Elliott Bay Design Group (EBDG) of Seattle.

Scott Joins Webb Institute

Webb Institute has appointed Benjamin H. Scott as the Assistant Professor of Marine Engineering. Scott is a design engineer with over 30 years of experience in thermal and hydraulic analysis, heat exchanger design, thermal performance testing and fluid system design.

Maher New Ship Repair GM at ASRY

Charles Maher is the new Ship Repair GM at ASRY, bringing 15 years of experience with top firms including Dormac, Grand Bahamas Shipyards and Southern African Shipyards.

Jet Edge Promotes Bauer

Waterjet systems manufacturer Jet Edge, Inc. announced the promotion of Josh Bauer to service manager. Bauer is responsible for managing all aspects of Jet Edge's waterjet service department, supporting customers worldwide.

ABS Subsidiary to Develop Maintenance Strategy for Golar FLNG Fleet

ABS Group subsidiary Genesis Technology Solutions, Inc. (GenesisSolutions) has been awarded a contract by Golar LNG to develop an intelligent maintenance strategy for the Company's new fleet of floating LNG (FLNG) vessels utilizing the GoFLNG floating liquefaction technology. ABS Group will provide a model for asset data, criticality rankings, spare parts analysis, a risk-based inspection strategy, failure mode and effects analysis and a maintenance program for the first GoFLNG facility under construction, the Hilli, which will operate off the coast of Cameroon, as well as for future vessels.

Jastram Technologies and Eco Marine Power Sign Agreement

Eco Marine Power (EMP) entered into a sales and support agreement with Jastram Technologies Ltd. of Canada. This agreement paves the way for EMP to begin offering a wide range of products and services to the Canadian shipping and offshore sector.

GE LM6000PG Marine Module Package Certified

GE Marine and GE Oil & Gas announced that the marine module package design for its LM6000PG aeroderivative gas turbine has been certified by Lloyd's Register and RINA. The test where the LM6000PG module effortlessly achieved 42 megawatts (MW) was conducted at the GE Oil & Gas facility in Massa, Italy. GE expects the actual Lloyd's Register and RINA certification documents to be in hand by spring 2016.

Metcalf to Keynote WISTA USA Luncheon

Kathy Metcalf, President & CEO, Chamber of Shipping of America was confirmed as the keynote speaker for the Eleventh Annual WISTA USA Luncheon at the CMA Shipping 2016 Conference in Stamford, CT, scheduled to take place at 11:30 a.m., Monday, March 21, 2016.

The luncheon is $70 for WISTA members; $80 for Non-WISTA members, and payment must be made in advance via check.

For information Email: wistausa@gmail.com or visit: www.wista.net

COSCON Selects CargoSmart

CargoSmart Limited, a shipment management software solutions provider that leverages big data for greater visibility and benchmarking, said that COSCO Container Lines Co. started to implement CargoSmart's online customer service and ocean carrier analytics solutions. The customer service solutions provide COSCON with process-oriented documentation and visibility tools for its customers to manage their shipments online. The carrier operations solutions help COSCON to optimize their vessel operations. Using predictive analytics, COSCON leverages CargoSmart's global vessel and route data to improve planning, marine operations and cost savings.

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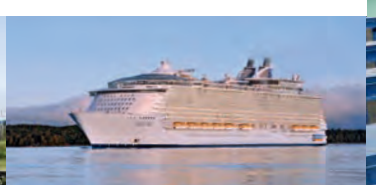

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www.cimaccongress.com

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This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all issues, only to companies with continuing advertising programs in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and not part of the advertisers contract, MR assumes no responsibility for errors. If you are interested in having your company listed in this Buyer's Directory Section, contact Mark O'Malley at momalley@marinelink.com

ANTI-CONDENSATION COATINGS

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Environmental Marine, Inc., 711 Colyer Rd., Bronson, KY , USA , tel:(606) 561-4697, bobkenison@aol.com

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BALLAST MONITORING

KING-GAGE Systems / King Engineering (tank level & draft monitoring), 8019 Ohio River Blvd, Newell, WV , USA , tel:855-367-2494, marine@king-gage.com, www.king-gage.com

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Hempel A/S, Lundtoftegårdsvej 91 2800 Kgs. Lyngby , tel:45 4593 3800, fax:45 4588 5518, marine@hempel.com , www.hempel.com

Tri-State Coating and Machine Co. Inc., 5610 McComas Road, PO Box 296, Salt Rock, WV V4W 3S8, USA , tel:1-800-477-4460, fax:304-736-7773, brichmond@tscminc.com

COMMUNICATIONS

David Clark Company (Wireless Headset Communication Systems), 360 Franklin Street, Worcester, MA 77060, USA , tel:(800) 298-6235 , www.davidclarkcompany.com/marine

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Essex Rental Corp., 1601 NE. Columbia Blvd. Portland ,OR 97211

Lifting Gear Hire, 9925 Industrial Drive Bridgeview, IL 60455

DRILLS

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HOISTS

Kleeco, 10110 S. M43 HIGHWAY Delton, MI 49046

INSURANCE SERVICES

WQIS (Marine Pollution Insurance Policies), 60 Broad Street, 33rd Floor, New York, NY , USA , tel:1-800-736-5750, fax:(212) 292-8716 , www.wqis.com

LIFESAVING EQUIPMENT

CM HAMMAR AB, CM Hammar AB, August Barks gata 15, 421 32 Västra Frölunda, Sweden, , tel:+46 31 7096550, info@cmhammar.com , www.cmhammar.com

LIFT EQUIPMENT

Kleeco, 10110 S. M43 HIGHWAY Delton, MI 49046

Lifting Gear Hire, 9925 Industrial Drive Bridgeview, IL 60455

LIGHTING SYSTEMS/ EQUIPMENT

Larson Electronics LLC, 11035 Jeanell Drive Kemp, TX 75143 , tel:(903) 498-3363, cred@larsonelectronics.com

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MARINE TRANSPORTATION

Central Boat Rentals, Inc., P.O. Box 2545, Morgan City, LA , USA , tel:985-384-8200, fax:985-384-8455, earl@centralboat.com or gary@centralboat.com

MECHANICALLY ATTACHED FITTINGS (MAFS)

Viega, 100 N. Broadway 6th Floor, Wichita, KS , USA , tel:904-315-3899, fax:888-782-6188, paul.switzer@viega.us contact: Paul Switzer, www.viega.us

MILITARY PATROL CRAFT MANUFACTURERS

Brunswick Commercial & Government Products, 420 Megan Z Avenue, Edgwater, FL 80204, USA , tel:(386) 423-2900, kelsey.nemeth@whaler.com , www.brunswickcgp.com

NAVAL ARCHITECTS, MARINE ENGINEERS

Bristol Harbor Group, Inc., 99 Poppasquash Road Unit H, Bristol, RI , USA , tel:(401) 253-4318, fax:(401) 253-2329, kribeiro@bristolharborgroup.com

Brunswick Commercial & Government Products, 420 Megan Z Avenue, Edgwater, FL 80204, USA , tel:(386) 423-2900, kelsey.nemeth@whaler.com

JMS Naval Architects, 34 Water Street, Mystic, CT 22203, USA , tel:(860) 536-0009 EXT 16, fax:(860) 536-9117, RickF@JMSnet.com contact: Rick Fernandes, www.jmsnet.com

The Shearer Group, Inc., 99 Poppasquash Road, Unit H, Bristol, RI , USA , tel:(401) 253-4318, fax:(401) 253-2329, kribeiro@bristolharborgroup.com

NITROGEN GENERATORS

Air Product AS, Vige Havnevei 78, 4633 Kristiansand, Norway, P.O.Box 4103 Kongsgaard, 4689 Kristiansand, Norway , tel:+47 38 03 99 00, norway@airproducts.com , www.airproducts.no

PRESS FITTINGS

Viega, 100 N. Broadway 6th Floor, Wichita, KS , USA , tel:904-315-3899, fax:888-782-6188, paul.switzer@viega.us contact: Paul Switzer, www.viega.us

RIBS & INFLATABLE BOATS

Wing Inflatables, 3701 Mt Diablo Blvd. Suite #200,, Lafayette, CA , USA , tel:(707) 826-2887, fax:(707) 826-0136, dkelly@wing.com contact: David Kelly

RUST AND PAINT REMOVAL

Rustibus, 2901 WEST SAM HOUSTON PKWY, NORTH SUITE E-325, HOUSTON, TX , tel:832-203-7170, fax:832-203-7171, houston@rustibus.com , www.rustibus.com

SENSORS

R.M. YOUNG COMPANY, 2801 Aero Park Drive, Traverse City, MI , USA , tel:(231) 946-3980, fax:(231) 946-4772, met.sales@youngusa.com

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STEEL, PIPE, ALUMINUM & ALLOYS

Texas Iron & Metal, 865 Lockwood Drive, Houston, TX 36652, USA , tel:713-672-7595, fax:713-672-0653, maxr@texasironandmetal.com contact: Max Reichenthal, www.texasironandmetal.com

VACUUM TOILET SYSTEM

Jets Vacuum AS, Myravegen 1 6060 Hareid , tel:47 700 39 100, fax:47 700 39 101, post@jets.no , www.jetsgroup.com

VALVES

Wager Company Inc., 570 MONTROYAL RD Rural Hall, NC 27045

WASTE WATER TREATMENT

Scienco/FAST – Marine Sanitation, Water Treatment, 12977 Maurer Industrial Dr., Sunset Hills, MO 33309, USA , tel:1-314-756-9300, solutions@sciencofast.com , www.sciencofast.com

WATER JET SYSTEMS

Marine Jet Power Inc., 6740 Commerce Court Drive Blacklick, OH 43004-9200, USA, Columbus , tel:(614) 759-9000 , www.marinejetpower.com

WELDING AND CUTTING EQUIPMENT

Profile Cutting Systems USA, Boulder Creek, CA 95006 , tel:(831) 338-8251, john@pcsusa.pro, www.pcsmachines.com

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Minimum Qualifications:
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Assistant Engineer
Minimum Qualifications:
- Degree from Maritime Academy or DDE 4000HP
- STCW w/security endorsement, TWIC, Passport

Barge Tankerman
Minimum Qualifications:
- AB rating, Tankerman PIC (BARGE)
- STCW w/security endorsement, Passport, TWIC

AB Deckhand
Perferred Qualifications:
- Academy Graduates
- 2 or more years of tug experience, STCW w/security endorsement, TWIC, Passport

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U.S. Licensed Master / Mate and Chief Engineer wanted

For tuna purseiners operating out of South America, STCW 95 REG II/1 or II/2 credentials for operating a class six purseiner, 1600 GT or higher.
Training in first aid, fire fight, security, GMDSS and ETP operator certificate needed.

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Please reply to : galvarezd@aol.com
ph: 305-336-6606

Marine Electronics Field Service Engineer

Salary: $ $20-$45 per Hour , Full Time , Company Employee

Category: Engineer / Naval Architect

Job Location:
90 Myrtle Street Cranford, NJ, 07016 USA
Contact
Partner-Marine Engineering
Email: mick@flagshipmgt.com
Work Phone : 954-577-5100
101 N. Riverside Drive, Sutie 210 Pompano Beach, FL, 33062 United States

Skills:
Integrated Bridge Navigation System Maintenance
Voyage Data Recorder
Radar
GMDSS
Radio
Marine Electronics repair and maintenance

Description:

Marine Electronics Field Service
Navigation and Integrated Bridge Systems
- Technical Education
- FCC License with Radar Endorsement a plus
- 1+ years experience with marine electronics service
- Willing to travel extensively
- TWIC Card Preferred
- Ability to read and interpret system documents
- Experience with Mackay or Radio Holland Equipment Repair is especially valued
- Associates Degree in Electronics or Electrical Engineering preferred
- B.S. Degree in Electronics or Computer Science highly valued
- Experience with marine industry, willingness to travel across US East Coast and Caribbean Region

Excellent Field Service Opportunity - base, overtime, per diem, car allowance, expenses covered. Great benefits.

Project Engineer

Curtin Maritime Full Time

Category: Project Engineering / Project Management
Job Location:
1500 Pier C Street, Berth 57 Long Beach, CA, 90813 United States
Contact
Email: curtinjobs@curtinmaritime.com
1500 Pier C Street, Berth 57 Long Beach, CA, 90813 United States

Position Overview:
Curtin Maritime is seeking a highly motivated, detail oriented professional to fulfill the Project Engineer role. The Project Engineer will report to the Chief Operating Officer (COO) and work closely with the Project Manager in supporting the new project proposal and bid process, as well as post award submittal and plan preparation throughout the projects life cycle.

Job Responsibilities and Duties include, but are not limited to the following:
- Provide support in reviewing, researching, writing and submitting project bids and proposals
- Review plans and other technical documents
- Assist in the development of cost estimates or tentative schedules
- Conduct new project research
- Assist with materials research, purchasing and project support needs
- Review, check and compile information and verify data for accuracy, completeness and compliance according to project specifications
- Assist with project mobilization
- Conduct client communications and updates on an as requested and needed basis
- Clerical Skills to maintain accurate records, reports, orders, etc.

Skills Required:
- Able to read, speak, write, and understand English in person and over the telephone
- Excellent interpersonal, verbal and written communication skills are essential in this collaborative work environment
- Ability to work independently, as well as follow directions and perform tasks
- Capable of working efficiently in an environment of constant change
- Possess time management and scheduling skills
- Strong attention to detail
- Ability to read/understand bid documents and specifications
- Proficient Computer Skills: Microsoft Word, Excel, PowerPoint, and PDF editing programs

Physical Requirements:
- Work is performed while standing, sitting and/or walking
- Must be physically fit enough to board barges and tugs at sea and in port
- Comfortable on construction sites
- Able to bend, squat, crawl, climb, and reach
- Able to lift, carry, push or pull weights up to 50 pounds
- Able to communicate effectively using speech, vision and hearing

Certification Requirements:
- Valid Driver's License
- TWIC card (or ability to obtain one)
- USCG Merchant Mariners Credential (or ability to obtain one)
- Able to pass a government background check and US Coast Guard physical and drug test

Education and Experience
- Minimum Requirement: High School Diploma
- Associates or Bachelor's Degree Preferred
- 3-5 Years in Commercial Construction or Marine Construction Industry
- Proposal preparation experience for government contracts preferred
- Maritime and Dredging experience preferred

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Grand Bahama Shipyard

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